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OUR CHILDREN

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Childhood is a term which includes the ages from birth to the end of puberty in the life of man. The period of childhood can be further subdivided into that of infancy—from birth to two years of age—the pre-school age—from two years until the child enters school—the school age—that period spent in school until the onset of puberty—and the adolescent—from the onset to the end of puberty. Kanner divides the childhood age into the “period of elementary socialization; the period of domestic socialization and the period of communal socialization.” The period of elementary socialization is that period during which the child is dependent on the environment, during which he learns to feel for things, pick up certain objects which he desires, to walk, to talk, and to acquire spatial orientation. When he has acquired this he is ready for the period of domestic socialization which is the rest of the pre-school period. During this period he is weaned from absolute dependence on the home and is prepared for community socialization when he learns to make adjustments with people outside of the home environment and is prepared to withstand the instability of adolescence.

According to Rosanoff the goal of training in childhood is “to render the child, gradually and progressively, in the measure of his growing capacities, increasingly able to be released from dependency, to engage in productive activities, to assume domestic and social responsibilities, to attain an adjustment in life that would be a happy one from his own standpoint as well as that of all others concerned.”

A brief survey of the average or normal child:

Vision occurs the second day after birth and at four to five months of age the child begins to recognize faces vaguely. At six to eight months he shows recognition and shows evidence of space orientation. At nine months he responds to words, but at one week he is startled by loud noises. The sense of touch is developed at birth, but the realization of pain seems to develop more slowly. Pain due to irritation of the sympathetic nervous system develops more quickly than that of the higher centers. However at one year it is so well developed that the child is prepared to avoid danger through experience. Very early, approximately at one to two weeks, locomotion is developed when the child is noted to stretch in his crib. At nine months he sits up and at one year he is beginning to walk. At a year and a half he walks alone unless this is deferred by the parents because of fear that he might hurt himself or because of the use of “walkers” which give mechanical support when the child should be using his own muscular system. At one year he shows signs of imitativeness and inventiveness and has already shown preference for objects and food. So we see that at the end of a year and a half to two years he is ready for domestic socialization.

Until this period he has been protected by the family but now he must learn to stand on his own feet so that he will be prepared to adjust properly at school and in the social life away from the family group. Until this period he has been completely egocentric, not recognizing the rights of others. It is essential that he now begins to recognize such rights in the social group. A normal, satisfactory adult life depends to a great extent,

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upon the training which he receives at this time of life. He progresses with a rapidity which is almost unbelievable. Even at the age of two he should be given simple tasks to perform and taught to complete them, these tasks becoming more complex as the child grows older. Since, until this period of his life, he has been completely protected, difficulty is apt to arise, but firm and kindly assistance will soon overcome the rebellious spirit as he learns to become self-reliant the adjustment improves. Allowing a child of this age to learn to dress himself may be trying for the mother or nurse but it is well worth while when we consider the future of the child and the avoidance of difficulty. All questions must be answered truthfully so that the parent will always be the confidant of the child, thus avoiding difficulty during the stormy period of adolescence.

During the years from 2 to 5 we are living through the golden period of emotional training—the period which (if promptly handled) will secure a normal adjustment in future life. The prolongation of the period of domestications, such as spoiling, over-solicitations and over-protection merely causes behavior difficulties later in life. During this period he must learn to become self-reliant and to mix with the group. He must learn that he has responsibilities to others and that he must take his part in the world without emotional upset.

The young child retains impressions and remembers words spoken, even if subconscious-ly, into adult years. Irritability, dissension, alcoholism, and other anti-social acts on the part of the parent in the presence of the child leave scars which may cause difficulties in behavior, neuroses or maladjustment.

We must give psychoanalysis the credit for the careful study which has led to our present knowledge of child behavior. It has removed inhibitions on the part of the parents and allowed them to see the child as an impressionable human being. The imitative qualities of a child at this age also make it imperative that the behavior of the parent in the presence of the child should be social in character but not inhibited by standards which are now recognized as being the result

of social approval of a past generation. The child is living in this generation and must meet present problems; so it behooves the parents to be alert and accept changes in custom as they arise.

During the period of domestic socialization, from 2 to 5 years, the child has learned to adjust with others. He has at last lost this complete egocentricity and recognized the rights of others. His habits have become social in character. He has learned that he owes society something for his existence. His emotional life is stable and he is now ready to enter the school period well equipped to meet new difficulties as they arise.

During the school age the child becomes equipped to face adult life. His natural curiosity is directed into proper channels so that he can obtain information in the quickest and most logical manner. He should learn to study efficiently and be taught not to allow various distractions to interfere with the work he has at hand. What he learns is important, but it is more important that he be taught how to learn. He must now learn to go out alone, choose his friends, to take the consequences of the decisions which he himself makes. He must also learn the rules of fair play and complete understanding of the rights of others without becoming overly submissive. He learns to think abstractly and at the age of eighteen learns to face life alone should the need arise.

Let us pause again to consider the physical life of the child. To obtain a proper adjustment with average care the individual must be in good physical condition and for this reason routine examination is of value, since the correction of minor defects prevents the development of major ones. Our knowledge of the endocrines has advanced markedly in the last few years and undoubtedly they play a major role in determining the behavior and personality of the individual. What is cause and what is effect has not yet been clearly demonstrated. The intricate relationship between the endocrines, the sympathetic nervous system, the intelligence, emotions and personality must still be clarified. It is during childhood, including adolescence that these glands develop, adolescence being the

time when the most rapid and drastic changes take place. Occasionally dysfunction occurs at birth and is recognized by the physician. We are familiar with the improvement in intelligence and behavior of the cretin when he is given thyroid treatment. True, there are normal variations in growth, as well as slight glandular dysfunctions which are of but little importance. Gross abnormalities of growth, either over or under development, sluggishness or hyperexcitability, menstrual disorders, should be noted, and therapy instituted if the endocrinines show evidence of dysfunction. Though we must admit that much is yet to be learned, new hormones are being isolated and their relation to blood chemistry discovered. Some are being prepared in the laboratories and are effective therapeutically. Yet the endocrinines are not the only factors which cause abnormal behavior in children. Listlessness and inattention may be seen in a cardiac case, or in a child suffering from a hidden tuberculous infection. These physical causes of varied behavior are not connected with the central nervous system although their effects are shown by psychic dysfunction. Yet these effects are directly due to the disease process. Other conditions may cause an indirect effect although there is no change in the body chemistry due to endocrine abnormalities or in strength due to pathological changes in vital organs.

Neurological conditions such as birth trauma and head injuries play their role in the behavior of the child, yet these make up the minority of cases with which we must contend. Most children when they are born are equipped to meet life successfully and it is only due to events which happen after birth that they have difficulty in meeting problems, since behavior reactions are merely a method of solving conflicts which arise.

The controversy regarding the effects of heredity and environment is still at its height. We have no proof that personality traits are inherited although we do know that the endocrine status is and that abnormality in the endocrine may lead to excessive emotionalism or to a lack of such. The pre-natal condition of the mother has a bearing on the future child's development and the importance of

complete physical examination of the prospective mother cannot be emphasized too greatly. It has definitely been shown that mothers suffering from hypothyroidism may produce children suffering from the same disease. It has again been shown that if these prospective mothers are given thyroid in adequate doses, the children are normal. Furthermore the amount of energy of which an organism is capable is also dependent on the secretion of these ductless glands. Behavior problems may arise if demands are made upon the individual beyond his capacity of withstanding. In other words the capacity to react and the amount of stimulation needed to react are inherited but the type of stimulation and the manner in which the reaction is expressed is environmental in character. Moreover, the action is reversible to a certain extent since excessive emotional stimulation of a normal endocrine system may result in a disease process which is definitely handicapping. The imitativeness of a child very young in years must not be forgotten as I have mentioned before. We have yet to prove that temper tantrums can be inherited in the same manner as the color of the eyes and hair. The child with tantrums is probably either imitating the behavior of someone he has seen behave similarly in the family group or he has learned that he has in these tantrums a successful method of gaining his own desires if the parents are unwise enough to give up discipline and allow the child to have his own way under such circumstances. The complete change in behavior that is often noted on sending the child away from the home bears out this theory. Anything which tends to block the individual's ego arouses resistance in the normal individual. At around the age of two there will often be noted a change in behavior. When one realizes that until this age one is dealing with an asocial completely egocentric organism, the reason can readily be understood. This change in behavior occurs when the completely egocentric child first learns that he must recognize the rights of others. Until he realizes that socialization is inevitable he is going to react to the attack on his selfish protected life. In other words, he will attempt to maintain a complete egocentricity.

Since it is impossible for him to understand abstract reasoning he is unable to appreciate the necessity of socialization for future adjustment. That is why early training is a conditioned affair—anti-social behavior being followed by discomfort, social behavior by satisfaction or reward. This is a law of civilization which rarely is successfully broken and the parent who does not teach the child to obey this law is more guilty than the child, who through lack of proper training gets into difficulty.

From the above it would seem that psychological traits are not inherited but acquired, the intensity or sluggishness of reactions being based on physical factors which react to some extent to physical therapy if the abnormalities are gross enough. On the other hand, it is impossible to deny that intellectual abilities are inherited and that many families carry a strain of defectiveness which may appear in only one child of a family group, depending upon the strength of the strain in the parental families. The inheritance of intellectual ability seems to follow the Mendelian law to a great extent. Intelligence is so complex that it defies rigid interpretation. On the whole it implies the ability to learn, to profit by experience, to acquire knowledge and to meet a new situation successfully by reasoning and abstract as well as concrete thinking. Tests have been devised to test an individual's intelligence and for statistical purposes the results have been quoted as the intelligence quotient. Yet the intelligence quotient is not the entire story and is too often used as the basis of a child's ability. An analysis of the test itself is essential if the child's true ability is to be determined. A child of ten often may have a quotient of 100 but yet fail tests in the eight year level while passing others in the twelve and fourteen year levels. This occurs in diseases which cause mental disorganization as well as children who are suffering from a specialized defect particularly in the field of reading. Orton explains this by cerebral reversal but all explanations are still so highly theoretical that none can be definitely accepted at the present time. The intelligence of a human being usually remains stable until senile re-

gression occurs. However its development may be retarded by overprotection and inhibition of the normal curiosity of the child. As to the intelligence quotient of the child, with 100 being considered the average, we find that the normal varies between 90 and 110, the dull normal and border line from 70 to 90 and the superior group from 110 to 140. As stated before, this is merely a classification for statistical purposes and the intelligence quotient does not mean that we can predict the scholastic ability of the child without analysis of the test itself to see whether the development is equal in all spheres.

We do not have time to discuss the defective or the very superior child. Both present problems which are equally serious. We must recognize the fact that most of our children fall in the group from the dull normal to slightly superior. It is essential that a child's intellectual ability be known since a timid child may appear to be defective and an aggressive child who talks freely may give the impression of being superior. Yet the reverse is often true. To give a child a fair chance in his school life both his intellectual and physical abilities should be understood and the amount required of him should not be beyond or below these abilities. Many difficulties in behavior arise because the child is unable to accomplish that which is required or, on the other hand, because he does not work to capacity, and so develops habits of idleness which continue into adult life.

Until recently the acquiring of knowledge seemed to be the sole aim of the past few generations. If the child behaved well and obtained good marks in school it was felt that nothing further need be done for his future. The parents were proud of superior ratings in school and felt that superior scholastic ability would insure success in adult life. We might call to mind a well known case in which a very intelligent boy was trained to consider work as play and play as work. He graduated from college at a very early age only to become a comparative failure in later years. We have now learned that superior scholastic ability alone does not lead to a satisfactory adjustment. As long as society demands that we live a gregarious life, ability to mix with

the group is the primary aim for successful adjustment. Knowledge, except in cases where it is to become a means of livelihood becomes secondary, intelligence being a greater asset. Knowledge is acquired by means of intelligence, but intelligence with social satisfaction will acquire knowledge and will be advantageously used. Withdrawing from the group is a sign of some abnormality, either of indifference due to improper emotional development, in which case isolation is the desired objective and the child is happiest when alone, or due to timidity or self-consciousness caused by a lack of confidence, feeling of inferiority and meagre socialization in early life in which case unhappiness is compensated by a striving to succeed in some field which does not require group activity or by brooding and frank discontent. True, a few asocial people have managed to live happy lives but they are usually among the geniuses or the defectives. The high intelligence of the genius may find satisfaction only in superior accomplishment, though most of them are socially inclined. On the other hand, the defective may not feel the need of society even as a very young child does not demand it, but we here also find that the defective usually seeks the society of others.

The child that stays at home, it is true, does not present the difficulty for the parent as does the normally gregarious child. But, if we recognize the abnormality present he becomes more of a problem as an attempt is made to socialize him. With a rapidly changing civilization the older generations find it difficult to understand the standards of modern youth. The difficulty has always been present but not as great as it is in this unsettled world of the young generation. The futility of older standards has been recognized by the intelligent younger group who realize that the codes of living of past generations are not the ideal ones for the present. Life is not as stable as formerly and the adolescent is demanding his right, that of becoming an adult and living his life as he sees fit. The parent with different ideals fails to appreciate the good in the younger generation. The acceptance of life as it is without being blinded by taboos and inhibitions is a healthy

attitude. The adolescent resents interference by the parent for he is living under a different code of ethics. Moreover, physiologically, he is becoming an adult and is striving for independence. He has reached the age when nature is preparing him to break from the family group and establish himself as an individual. At this age the home problem should be one of guidance, not of discipline. The average adolescent is anxious to discuss his problems but he wants the discussion to be on a basis of equality. He is ready to receive advice if that advice is acceptable to the generation in which he is living. The sereged and stockinged bathing suits of years ago would merely result in ridicule today. The chaperon belongs to this era as does false modesty. Frank sex discussion emphasizing the physiological side and giving adequate explanations for the ethical standards is of more value than a prudish attitude of do or don't without explanation. At any rate it does not insult the intelligence of the adolescent who is just beginning to feel the satisfaction of abstract thinking. A prudish attitude either inhibits full understanding leading to later marital difficulties or arouses a spirit of resentment which leads to experimenting with often tragic results. The parent who has become the friend and confidant of his child may often disapprove of what his child is doing, but at any rate he knows that his child will come to him when in difficulty. It would be well for the parent to visualize his own adolescent years and to realize now unadjusted he would be in the present young world were he to try to carry out the same standards. We may bemoan the fact that there is more drinking, more late hours, more entertainment away from the home, but let me assure you that the normal child does not become aleoholic unless he is escaping from some conflict, a conflict which might never arise with the proper child-parent relationship. More harm is done by undue excitement than by calm acceptance. The adolescent striving for adjustment not quite sure of himself, restless, longing to be completely self-sufficient, being forced to withhold the expression of normal instincts in our present economic status and therefore nervous and tense, often

afraid that he will be unable to live up to the expectations of his relatives and friends, wondering if he will reach his goal, is too ready to feel a resentment and defiance merely to cover his own feeling of doubt and insecurity. Discipline is much too apt to add a feeling of inferiority which is the one straw needed to produce serious difficulty. If discipline with resulting fear is needed at this age, it is because proper training has not been used during the earlier years.

But what about the problems which arise from time to time during these early years. Being a parent is a vocation and no one is perfect in his or her work. How shall we correct the mistakes which all make at times, mistakes which are shown by the behavior of the child. The parent had new material to work with, if mistakes were made they must be corrected. It is possible that the material was not as strong due to pre-natal factors and an added responsibility must be assumed so that handicaps can be overcome.

There are no set rules by which a child can be trained since each differs from the other. Each child even in the same family group will need a different type of discipline. We often overly appreciate the child who is especially well behaved, failing to recognize that the misdemeanors are often the result of the necessary aggressiveness which a competitive world needs. This aggressiveness should be approached and given a constructive outlet.

When there are two or more children in the family group, it is often extremely difficult to avoid showing favoritism. The well behaved child is too often held up as an example to other members of the group, thereby creating a sibling antagonism. We have been inclined to stress the problem of the only child. The only child is no different from any other child, provided he has social outlets at the proper age and provided that he does not receive too much personal attention which will spoil him. Fortunately if this has occurred in his early life, he adjusts when he goes to school and resents the excessive attention on the part of the parents, often causing a certain amount of conflict at home. However, the child is merely taking a normal

attitude. Unfortunately too many books have been written about child training until we fail to realize that we are dealing with human beings instead of mathematical problems. Too often, in fact in most cases when the child is in difficulty, we find in clinic practice, it is the parent who needs the treatment. When the intelligent parent learns to analyze his own reactions, to overcome his inhibitions and until he can analyze the family relationship as if he were not a member of the family group and were an outside person, difficulties will arise. It is because this is such a difficult attitude to take that it is often necessary for children to be brought to psychiatrists so that the situation can be analyzed in an unprejudiced manner. Most parents quickly recognize their errors when they are demonstrated to them and it is remarkable how often behavior problems will disappear when the attitude of the parent is changed.

As I said before it is impossible to give any recommendation as to how to handle any type of behavior problem because they all have various etiologies dependent on the parent attitude, the social life of the child, physical condition of the child and other factors. Each case has to be handled as a single problem. Too much concern is unnecessary, for the normal child tends to become socialized in spite of his environmental factors. It is only when these factors have gone beyond his power of resistance that behavior difficulties arise.

MALE HORMONE THERAPY OF THE MALE CLIMACTERIC AND THE GONADAL INSUFFICIENCY STATE

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The male sex is not immune from exhibiting evidence of gonadal insufficiency. The evidence may be objective, or objective and subjective, in character.

There is no contention concerning the objective manifestations of male gonadal insufficiency, with the possible exception of cryptorchidism; however, the subjective signs or symptoms are likely to be a point of disagreement in some quarters. This should not cause

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undue concern, since the same subjective symptoms present in female gonadal insufficiency are still disputed, by a diminishing minority, however.

Papers by Donald (1), Werner (2), McCullagh (3), and others have shown that symptoms of mental, nervous, neurocirculatory, and of general character are experienced as gonadal hormone deficiency occurs in the fifth and sixth decades of a masculine life and that this state can be designated as the male clamaesterie. Werner calls attention to the fact that the symptom groups of nervous, neurocirculatory, and general character as observed in certain males significantly correspond to those observed in the female castrate and climaxis.

Among the prominent nervous and mental symptoms are irritability, sudden mood changes, crying, tendency to seclusion, depression, headaches, suboccipital tension, lack of interest in social and business life, lack of mental concentration and energy.

The neurocirculatory symptoms include vertigo, hot and cold flashes, excessive perspiration, chilliness, coldness of dependent parts, numbness, tingling, sharp or dull extremity pains, tachycardia, and palpitation.

The general symptoms are chiefly weakness, lack of endurance and physical strength, a feeling of inadequacy or incompetency in carrying on their former activities, or in engaging in new duties. Responsibility either hangs heavily on their shoulders or they evade it.

The combined effect of various symptoms in these various groups is conducive to precipitating a profound psychic imbalance and occasionally the individual conceives himself to be useless, hopeless, and burdensome, and plans and sometimes carries out his self destruction. This phase of gonadal deficiency, therefore, becomes an important part of therapy, from the viewpoint of an institutional, as well as a specific and general, therapeutic problem.

There exist other subdivisions of gonadal insufficiency which require attention. Among these is the developing male. The lack of virilistic maturity is well exemplified in the Frohlich syndrome. In such individuals the

lack of physical and mental energy of the male sex is conspicuously noticeable. The lack of aggression, the petulance, irritability, anger tantrums, and the frequent trend toward stealth and deception, as well as occasionally toward more serious practices, present a problem equally serious in medical and social life. Convulsions have also been observed in the Frohlich syndrome.

As a more general type of underdevelopment, we have cases which evidence marked retardation in structural growth, along with marked hypoplasia of the testes. In such cases, we are confronted by the fact that either the tissue cells are unresponsive to hormonal stimulus, or there is a deficiency of hormones of the type required.

The most unhappy case type of gonadal deficiency is the eunuchoid. This individual probably experiences the greatest continuous psychic trauma because of the fact that his condition is physically apparent to all well informed individuals. His youthful appearance, lack of secondary sex hair and beard, fair thin skin, unchanged voice, abnormally long extremities, the extremely small genitals which he attempts to hide from all others' sight, and the definite knowledge that this condition bars him from marital happiness are definite causes for his mental outlook on life.

Other cases of gonadal insufficiency are observed in the atrophy of the testes following mumps; infections of the testes, as in tuberculosis; in anatomic or pathologic disorders; and in castrates.

In the Delaware State Hospital and its associated departments, we have occasion to study particularly the mental and nervous phases of gonadal insufficiency disorders. The availability of the male hormone in the form of Testosterone Propionate* in oily solution and in ointment form has presented an opportunity to use this therapeutic agent in cases of gonadal insufficiency and at the present time, we are reporting our experiences in a group of 15 cases which have treated with Testosterone Propionate by the parenteral and percutaneous methods. The major-

* Orenton—(Schering). We are indebted to Dr. Max Gilbert of the Schering Corporation for a supply of the testosterone propionate.

ity of the cases have been submitted to complete physical, laboratory, and especially, endocrine surveys. We shall only cite the positive findings in the presentation of the cases.

One of the hazards of reporting the conclusions of a therapeutic study of a new medicinal agent in homo sapiens is that the authors must anticipate the critiques of those who formulate their basic concepts of therapeutic agents on laboratory experiments performed on a species of animal, or animals. These are at best remotely related genetically, and mentally are vastly inferior to man. Clinical states observed in man, such as subacute, chronic, and developmental dyserasia, are relatively unattainable in the experimental animals. Recent research in hormone assay has definitely established the difficulty, if not impossibility, of obtaining corresponding reactions in different species of animals to a pure and weight-measured hormone. Even under so-called standardization methods, with only 50% of the experimental animals—genetically alike and of corresponding age—testing positive, we are advised that we are dealing with an active hormone preparation.

We have studied with interest the report of the Council of Pharmacy and Chemistry of the American Medical Association, (4) and our effort is to interpret the reaction of testosterone propionate in the human as suggested in their report. It is evident from the virilizing effect (hypertrichosis, hypertrophy of the clitoris, and voice change) produced in physically normal females, administered testosterone propionate in large amounts over a short period of time to control excessive uterine bleeding, that a potent hormone is being introduced into the human body when this substance is administered.

Because of its corresponding sex organ origin and its chemical similarity to the female sex hormones, as well as certain biological experimental evidence of tissue activity, one should anticipate a somewhat parallel sphere of clinical application in the human male, with male hormone, to that experienced in the female. This should particularly be true of its lack of direct stimulative effect on the gonad.

It is quite probably the ease with male hor-

mone therapy, as was experienced as early as 1933 (5) in the matter of female sex hormone therapy, that the all important factor—the extent of dosage to be used for the hypogonadal female—was an individual problem and that basic premises were a correct diagnosis and clinical as well as laboratory estimate of the degree of deficiency.

It is to be expected, therefore, as was indicated in the Council's report, that male hormone therapy should be and has been most demonstrable as effective in cases of frank gonadal insufficiency, such as is exemplified by eunuchoidism.

From this we may obtain certain basic principles of therapy; namely, that the extent and degree of the complex clinical picture is dependent upon: (1) The amount of the specific hormone deficiency; (2) the duration and degree of its progression; (3) the extent of disturbance of endocrine interrelationships; (4) the tissue and blood chemical responses to be effected.

In an attempt to conform to the above principles, we have regulated our dosage and the method of administration. One should not expect corresponding results with varied methods of administration, nor when dosage is unequal or tissue reactivity is patently dissimilar, as in the cases of infantilism.

Topical application of male hormone was purposely used in single males, for obvious reasons, and the frequency and size of dosage by hypodermic injection was regulated according to the activeness of the clinical problem. It is our opinion that there is less likelihood of the occurrence of untoward results if the problem is approached by ascending dosage and particularly in cases of retarded maturity before adult age is attained.

Excessive stimulation of libido and increased potency may not be desirable in the male climacteric, and particularly in cases with a suggestion of angina or marked hypertension.

The dosage exhibited was hypodermically—30 mg. to 150 mg. of testosterone propionate weekly. Therapy was concluded in most cases at the end of 12 weeks and dosage gradually reduced as the symptom picture improved, or signs of sexual activity were

made manifest. The ointment preparation—containing 2 mg. per gram of ointment—was administered in dosage of 33 mg. per week, and continued for 3 to 4 months. Occasionally, it was used to supplement a weekly injection of the hormone.

The series of 15 cases of gonadal insufficiency treated with testosterone propionate may be further classified as:

Eunuchoidism—5 cases.

Testicular Hypoplasia—2 cases.

Testicular Atrophy, following mumps—2 cases.

Secondary to Anterior Pituitary Deficiency—(a) with infantilism—and—(b) with cryptorchidism—2 cases.

Climacteric—4 cases.

Case 1

Male, aged 28 years, single. He was first admitted to the hospital in 1935. Between that time and December, 1937, the date of his last admission, he has been in and out of several institutions.

When admitted, he was 6', 1 5-8" tall and weighed 163 pounds. B. P. was 135/65. His physical examination was essentially negative except for residuals of intoxication.

On a couple of occasions while out on a visit, he became intoxicated. Following one of these experiences, he was hallucinated in both visual and auditory fields and he imagined he heard insulting remarks about himself. These imaginations gradually disappeared and he was allowed to leave the hospital in September, but was returned again in November during which time he had another attack, psychotic in nature. Gradually his attitude changed, however, and he again made a complete recovery and left the hospital in May, 1936. The diagnosis at this time was alcoholic psychosis, acute hallucinosis.

He returned east in 1937, and on another alcoholic episode became assaultive and was returned to the hospital. While in the California sanatorium, he attempted suicide.

Physical examination at this admission stated his height was 6', 3 1-2" and weight, 144 pounds. At this time he gave the appearance of being undernourished. B. P. 114/70. Otherwise, he was physically negative. All laboratory examinations were negative.

He did not show any delusions of hallucinations when first admitted but remained tense, depressed and kept to himself. In about a week, it was noticed that he was not feeling well and he was beginning to refuse food. On December 13, he weighed 136 pounds. He showed, under careful watching, some improvement, and January, 1938, was working outside, but within a few days showed more decided peculiarities. He was abstracted, would break into conversations or interrupt activities of others, became neglectful of his own personal hygiene, which was entirely contrary to his previous behavior. He was studied carefully from a physical standpoint and received a gall bladder drainage in the early part of February, which showed the gall bladder was functioning normally. While out of the hospital in the early part of May, he again became intoxicated, from which time on he began going down constantly. He would avoid contact with hospital authorities by hiding. He ran away again and again and became intoxicated. He was rather aggressive in his attitude, which was an attempt to cover up his depression. It was impossible to keep him in bed at rest and in July, he had reached a weight of 108. At this time, he was overactive, paced the room, stated that he was definitely hallucinated, but was well oriented and talked fairly reasonably. He would refuse food, saying it would simply put on fat and he would lose strength.

In July, 1938, the endocrine survey revealed evidence of hypoplastic gonads with a measurable increase in lower extremities growth and he was placed on oreton, 25 mgm. twice weekly, for 4 months. On August 14, though he showed some improvement in his general status, he reached the low weight of 104 pounds and his systolic blood pressure was around 90. He was given intravenous injections of glucose at this time. He made a gradual but steady improvement. He again began to be very active, was much more content, played tennis, and in spite of still being markedly underweight, showed rather remarkable stamina in his activities.

In October, he left the hospital, free from delusions and hallucinations, fairly well ad-

justed socially within the hospital group, weighing 116 pounds. This increase in weight had been gradual, but steady. His blood pressure had at that time come up to around 120 systolic. He had not attempted to break parole on this recovery.

A letter was received from him around the first of April, in which he stated he was doing well physically but still had periods when he felt inadequate. He is at present doing hard physical labor and weighs 180 pounds.

Case 2

Male, aged 29 years, single. Previous history: Slow early development, enuresis until 19 months. Had all childhood diseases. Convulsions at 3. Fell in hospital, striking head. One side paralyzed, said to have had hemorrhage of the brain. At 8, family noted that he imagined seeing objects at times. Improved after age of 15, but has had "spells" as long as he can remember, in which things would suddenly get dark before his eyes, he would drop things, momentarily lose memory, have sick feeling in stomach, and then return to normal but for splitting headache lasting a day or so; was afraid of being alone. Voice has always been high-pitched.

Present Complaints: Every two weeks, he has attacks of weakness and dizziness, epigastric distress, eructations of gas, depressed feeling, mental confusion, amnesia, followed by a frontal and vertical headache, throbbing in character. Mental confusion lasts from 3 to 5 days. In next 24 hours, has 5 series of acute attacks of syncope, dizziness, etc. The following day, he would have 3 attacks and gradually the frequency and intensity lessened until symptoms all disappeared on fourth or fifth day. The attacks usually appear at night. He observed that drinking whiskey or large quantities of beer lessened the intensity and duration of the attacks, so he has deliberately drunk excessively, more or less, for a few days during the attack. Occasionally, the attacks of coma last for 2 to 3 hours, followed by long periods of disorientation and severe headache. During the attack, he rolls his eyes, may moan, and then become unconscious for a few hours. The following morning, he complains of severe headache and then he has

the less severe attack as described, but for 4 to 5 days.

Physical Examination: Male, adult of oldish appearance, poor stature and obese. Hair is light, fine texture and moderately thin. Face is smooth, lacks normal hair, thin texture and of glossy and reddish appearance. Neck is thin. Thyroid is not palpable. Shoulder girdle appears narrow and is not heavy. Chest cage is large, with obese mammary deposits; nipples are the moderate size and areola are the size of a 50c piece. Numerous follicles present. Color is pink. Heart is normal. Pulse is 80. Blood pressure, 122/80. Lungs, negative. Abdomen, markedly obese, no hernias. Lower extremities are long. Pubic hair is sparse. Hirsutism—axillary hair, sparse; eyebrows thin, downy hair on extremities; lacks essential male hirsute characteristics; downy hair on face, shaves every 3 weeks. Genitalia, infantile.

Therapy: Testosterone propionate, 30 mgm. weekly for 10 weeks.

Results: General condition improved in that he feels better, with practically no depression after attacks which ordinarily lasted 2 or 3 days. No headache after attacks. More energy and desire to do things. Had no attacks for 6 weeks and only 1, 2 days later, which was of minor proportions. Has noted that the day following an injection, he feels better and if he is not feeling well, an injection braces him and removes early symptoms. Increase in libido and erection.

Case 3

Male, aged 21 years, single. Previous history: Mumps; appendectomy. Rapid growth from age 14 to 16 years. Always slender.

Present Complaints: Deficient beard and secondary sexual hair. Deficient libido and potency. Lack of masculine interest and physical strength. Poor mental energy. Inability to gain weight. Pallor.

Physical Examination: Weight 113 $\frac{1}{4}$ pounds. Height, 67 inches. Lower measurements, 35 inches. Face, pallor; thin smooth skin. Pubertal type of hair growth. Axillary and genital hair growth deficient. Genitals: penis underdeveloped; testes—size of medium olive.

Therapy: Testosterone propionate ointment

applied nightly; 33 mgm. testosterone propionate per week.

Results: Increased libido and potency; increase in beard and genital hair. Weight increase of 8 pounds. Increase in physical and mental energy. Loss of facial pallor and generally improved psychic and physical outlook.

Case 4

Male, single, aged 19 years. This is a case of hereditary deafness and eunuchoidism of severe degree. A bilateral orchiopexy had been performed earlier, for cryptorchidism and hypogonadism.

He was referred because of a lack of physical energy and aggressiveness, as well as general failure to exhibit adult masculine changes.

Therapy: He was given 10 injections of 10 mgm. of testosterone propionate per month for 4 months. At the end of this period of time he exhibited a marked increase in secondary sexual hair; an increase in size of the penis, but no apparent enlargement of the olive-pit-sized testes. His instructors report a great increase in energy and attention to his manual training. His outside activities are more eagerly entered into and aggressiveness in sport has been noted. His mannerisms and attitude are less boyish.

The dosage has recently been increased to 25 mgm., 3 times a week, to observe the effect on testicular development.

Case 5

Male, aged 16 years, single. This is also a case of deafness and retarded growth and genital development. He was referred for the above, but primarily for his lack of physical and mental energy in adapting himself to his manual training.

He has received the same therapy as Case 4, and the results here are the same as in that case—increase in pubic and axillary hair, increase in the size of the penis, and no apparent increase in the size of the testes. There has been improvement in his attention to his training and increased energy output.

An observation worth noting is that when first examined, both of these cases were reluctant to undress and expose their genital

underdevelopment. With the growth of pubic hair and enlargement of the penis, they are less averse to exposing themselves in the presence of others. This is of importance, we believe, since it is the common reaction in most, if not all, cases and leads them away from athletic and outdoor activities.

Case 6

This boy, age 14 years, is also deaf and exhibits the physical features of what is commonly designated as "Frohlich syndrome." He exhibits a definite tendency to retain a prepubertal mental development and diminished physical energy and adaptability to his normal age activities.

The genital development is as follows: The penis is of normal size, the testes are cryptorchid (high scrotal), and are markedly hypoplastic; axillary hair is absent and pubic hair is moderate and sparse.

Therapy: 6 months earlier, he received a course of 6 injections of androstine without results.

Therapy—later: Testosterone propionate ointment—150 mgm.—was administered.

Results: Increase in pubic hair and appearance of axillary hair.

Case 7

Male, aged 14 years. This child is deaf and exhibits retarded growth and gonadal development. There is a left cryptorchidism (inguinal) and both testes are about the size of a small olive. His penis is small but is erect.

He is muscularly developed and much brighter than the other child of 14; his treated control since both received testosterone propionate ointment in equal amounts.

This boy has failed to exhibit any marked evidence of therapeutic effect except slight evidence of pubic hair growth.

Case 8

Male, aged 43, married. This patient had mumps at age 16 and at age 25, a left orchidectomy for tuberculosis of the testes. He was thin prior to operation and gained weight excessively postoperatively.

At age 41, he noted a marked decline in sexual desires, and at the age of 43, they are nil. He complains of loss of physical and

mental energy, periods of depression, and rather persistent head pains in the frontoorbital and sub-occipital region. There have been vague but annoying pains in the upper extremities and stiffness in the joints.

Therapy: The patient received 25 mgm. of testosterone propionate twice a week for 3 months. At the end of 1 month's treatment there was a definite increase in libido, potency, mental and physical energy, and lessening of the head pains. The testosterone therapy by hypodermic was then reduced to once weekly and the ointment prescribed.

There has been no appreciable loss of improvement 2 months following discontinuance of hypodermic medication.

Case 9

Male, aged 35 years, married. At age 25, the patient had mumps and orchitis (right). Shortly thereafter, he gained weight about the lower abdominal and pelvic girdle. The right testicle atrophied and has been sensitive to touch since then. When, after 3 years of married life, no pregnancy occurred and he observed diminished sexual desire, a semen examination was made and it showed a low count and few active sperms. He received a series of anterior-pituitary-like injections with no improvement.

During the past 2 years, he has complained of the following symptoms: Lessening of physical and mental energy, irritability, depression, frequent loss of temper, diminished libido, and premature ejaculation.

Therapy: He was administered 25 mgm. of testosterone propionate in oil twice a week.

Results: At the end of a month, the sensitivity of the right testes was lessened, and in 7 weeks, it had disappeared. He also noted increased sexual desire, prolonged erection, and improved physical energy. The depressive periods had markedly lessened and in 12 weeks, he was in a generally good mental and physical state. He lost 10 pounds of his excess weight. He had less frequent loss of temper, and his mental attitude towards his business and social life was vastly improved.

Case 10

Male, single, aged 21 years. The general physical examination of this case was negative except as noted.

The chief complaints were deficient and regional beard growth, profuse sweating, lack of physical energy and aggressiveness, emotional and nervous instability, rapid pulse, increased systolic pressure (135 mgm. of hg.), rapid pulse, loss of scalp and body hair, and regional weight gain of the adolescent feminine type.

There was marked hypodevelopment of the right testes; the left testes was normal in size and the penis was of a low normal size.

Therapy: 10 mg. of testostertone propionate in oil was administered twice a week; a total of 250 mgm.

Results: Appreciable change was noted in beard growth and the nervous instability. He was then given a course of pereutaneous therapy for 6 weeks. There was a return of symptoms and 25 mg. of testosterone propionate was given weekly and the ointment continued. At the end of a month the nervousness and emotional instability were considerably lessened and the beard became heavier and new facial hair growth was evident.

Case 11

Male, aged 70, married. Onset of symptoms at age 69 years. Patient began to perspire freely, particularly at night, sufficient to soak his pajamas and disturb his rest. He contracted frequent colds and was annoyed by waves of cold and hot spells. Nervousness, irritability, and depression appeared, accompanied by marked loss of physical ability and mental energy. Mental effort was accompanied by excessive sweating of the face, scalp, and hands. Numbness, tingling, and coldness were present in the right leg. Loss of libido and potency had been observed.

Physical and laboratory examination failed to reveal any causes for the symptoms and the genitals were of the average size for his age.

Therapy: Testosterone propionate, 25 mgm., was administered 3 times a week for 4 weeks, and during the last 3 weeks, 10 or 25 mgm. were administered.

Results: There was a marked improvement in the physical and mental effort; the depression, irritability, and general tenseness disap-

peared. The sweating has greatly diminished and the hot and cold spells disappeared. There was an increase in libido at the end of 4 weeks of therapy and the dosage of testosterone administered was reduced.

Therapy was discontinued at the end of 7 weeks and 4 months after stopping therapy, there has been no recurrence of symptoms.

* * * * *

The results in the therapy showed, in general, a relief of symptoms proportionate to the dosage administered. The effects, when obtained, were either general and specific, or symptomatic. Under general effects, we include gain in weight in thin individuals, improved facial appearance and color, and the abnormal youthful appearance being replaced by a more virile and stamina-like countenance.

The measured production of the facial hair growth and particularly that of the secondary genital hair should be considered essentially as a specific effect of male hormone therapy, but this specific effect, which is one of the earliest manifestations of male hormone activity in the normally developing male, is usually overshadowed by the improved psyche. Nevertheless, the hair growth should be considered as an early sign or evidence of body response to testosterone therapy, this being especially true of cases exhibiting deficient sexual hirsuties. About this time, there is an appreciable but not prominent increase in libido, and then, if there is no available normal outlet for sexual desires, erection and potency reach an annoying stage. This want also improves the psychic condition.

The increase in physical energy, as well as in the ability to sustain physical effort over a greater period of time, is even more marked. There is greater mental ability not only in concentration but in the fulfilling of social and economic responsibilities. There is, first, a mental quietude and repose replacing the previous irritability and, later, as the energies improve, there is increased interest in business and social life and activities. When neurocirculatory symptoms are present, their abatement contributes materially to the mental and physical improvement.

The absence of head pressure pains, the

numbness, tingling and neuritic extremity pains, the disappearance of the emotional outbreaks, particularly anger spells, allows their home and outside social activities to be again planned without fear of unpredictable aggravated attacks of symptoms peculiar to the climacteric. Thus the treatment and subsequent improvement of this type of case has both a primary and a secondary social benefit. And in married men, with the recurrence of increased libido and potency, there is a return of mutual sexual satisfaction.

We have stated that a disturbance in the endocrine interrelationships may play a part in the symptom complex. Two phases of its disturbed activity may manifest themselves: One, an accentuation or aggravation of the existing autonomic imbalance; the other, a product of a separate pattern of symptoms. The latter situation is more likely to occur when the gonadal deficiency is secondary to a primary anterior pituitary deficiency. The most typical case of this type is the eunuchoid with markedly hypoplastic testes. Such an individual is susceptible to attacks of hypoglycaemia. The symptoms associated with this condition are mild, or extreme, varying from nervousness and irritability to convulsions and coma. The most valuable differential point in indicating the possibility of hypoglycaemia is the patients' craving for sweets and aleoholic drinks to offset the fall in blood sugar and the sugar tolerance test, demonstrating hypoglycaemia. The disturbance in the endocrine interrelationships responsible for the precipitous fall of blood sugar is the deficiency of diabetogenic factor of the anterior lobe, antagonistic to insulin; i. e., since insulin lowers blood sugar and the diabetogenic factor elevates it. Thus, the presence of hypoplastic genitalia does not resolve the endocrine therapy of the case into that of male hormone exclusively; nor does it exclude appropriate supplemental therapy.

It is not always possible to obtain rapid therapeutic effects, even by hypodermic administration of the testosterone propionate. Accordingly, we believe that proper sedation has a field of application during the early acute clinical conditions, but as soon as adequate male hormone therapy has been accom-

plished, the sedation should be reduced and later discontinued.

Male hormone therapy is a replacement therapy instituted to gain control of a deficiency state. A cure cannot be established during the period of life when the physiological demand continues to create a deficiency, or the mechanism of endocrine interrelationships requires the presence of male hormone to maintain it in a normal effective state.

Conclusions: Our present experience with male hormone therapy show it to be effective in relieving the nervous and mental symptoms associated with the hypogonadal syndrome.

The dosage required varies with the degree of gonadal deficiency. To date, 30 to 150 mgm. weekly, administered hypodermically, have given the best results. As the therapy is one of replacement, symptoms may recur when the deficiency state recurs.

Percutaneous application of testosterone propionate in lanolin shows evidence of effective absorption of the male hormone by the manifestations of increased hirsuties and a general constitutional effect. Its present strength does not appear adequate to relieve the symptom state.

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FATAL HEMORRHAGIC SHOCK FOLLOWING NEOARSPHENAMINE

Report of a Case

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A forty-four-year-old obese colored woman was admitted to the Delaware State Hospital, Farnhurst, on November 17, 1937, for treatment of involutional melancholia of seven years duration. During the initial examination her blood Wassermann test was found positive. A history of exposure to syphilis could not be obtained, and no clinical evidences of the disease were detectable. The spinal fluid Wassermann was negative, showed a flat colloidal gold curve, revealed no in-

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crease in globulin, and had a cell count of seven per cubic millimeter. The spinal fluid pressure was eighteen millimeters of mercury. The blood count, the blood chemistry, and urinalysis were normal. The blood pressure was 110/76. Her weight was 200 pounds and her height 167 cm. There were no other important positive findings.

Antisyphilitic therapy was promptly started. From November 26, 1937 to March 11, 1938 she received fifteen weekly injections of neoarsphenamine, 0.6 grams at each treatment. These were followed by twelve weekly injections of 2 cc. iodobismitol, between March 14, and June 6. A third series of treatments was started July 22, 1938. Neoarsphenamine was again given, 0.6 grams at each injection. The first two treatments produced no adverse effects.

On August 12, 1938, an injection of 0.6 grams of neoarsphenamine was administered intravenously in the usual manner. This took place at 3 p. m. At 4 p. m. the patient's gums were discovered bleeding profusely. When local applications of epinephrin solution proved unsuccessful in checking the hemorrhage, two injections of sodium thiosulfate were given intravenously at 5 o'clock and 6 o'clock. At this time the patient's body temperature was 101.8°, and the blood pressure, which was 104 systolic at five o'clock, had fallen to forty. At seven o'clock a proctoclysis of adrenalin in five per cent glucose solution was started, and six cc. of human blood was injected into her left hip. At eight o'clock the patient received one cc. of adrenalin intravenously which produced a transitory blood pressure elevation. By 8:30, she was in a state of shock, with cold skin, continual cough, air hunger and vomiting of bloody fluid. Bleeding from the gums continued. Two cc. of epinephrin intravenously momentarily raised the blood pressure to 80/40. At nine o'clock the patient was in deeper shock. Coarse moist rales appeared at both lung bases. Five hundred cc. of coffee was introduced per rectum. At 9:10 p. m. a profuse nasal hemorrhage took place. Respiration ceased at 10:05 p. m. A blood count taken a few hours prior to death showed 3,960,000 red blood cells, 72% hemoglobin,

and 9,150 white cells, with 78% neutrophiles, 19% lymphocytes and 3% large mononuclears. The platelet count was 185,600. The coagulation time was 4½ minutes and the bleeding time was fifteen minutes.

Approximately forty other syphilitic patients had been treated that same afternoon. All were given intravenous neoarsphenamine from the same large bottle of drug solution, freshly prepared from powder obtained from a reputable manufacturer. None of these other patients suffered any undue effects.

At necropsy, pitting edema was demonstrable in the soft tissues of the extremities and trunk. Ecchymoses were seen in each antecubital fossa, spreading out from needle puncture marks. Petechiae were scattered within the conjunctivae and in the oral mucous membrane, but could not be seen in the skin. Bloody fluid was oozing from the gum tooth junctons. The gums were clean and not spongy.

Petechiae were scattered over the peritoneum. Twenty cc. of blood stained fluid had collected in the pelvis. The enlarged liver weighed 1500 grams, and measured 27 by 20 by 7 cm. There were no hemorrhages within its dull, fatty parenchyma. The larger veins were dilated and filled with unclotted blood.

The spleen weighed one hundred grams and measured 11.5 by 6 by 3 cm. The pulp was very soft, semi-liquid, and dark red in color.

The adrenals were normal and free from hemorrhages.

The mucous membrane of the stomach was intensely congested. Stomach and duodenum were filled with chocolate colored fluid. Clotted tarry blood lay in the jejunum. The ileum and the large intestines held yellow fecal fluid. Circular hemorrhages up to three centimeters in diameter were scattered throughout the mucosa and wall of the entire gastro intestinal tract. These were fresh, purple red, and most abundant at the pylorus and in the transverse colon. Petechiae were observed on the kidney surfaces, within the bladder, and on the surface of the myomatous uterus. The ovaries contained hemorrhagic cysts. The uterus was enlarged and nodular.

The pleural membranes showed many petechiae. Twenty cc. of blood tinged fluid was found in each pleural cavity. The pericardium held thirty cc. of similar fluid.

The lungs were purple-red, indurated, and together weighed 1500 grams. Petechiae dotted their surfaces, and the parenchyma of each was evenly infiltrated with sero-hemorrhagic fluid. The trachea and large bronchi were filled with bloody froth. Their mucous membranes were liberally sprinkled with tiny hemorrhages. Pneumonia or larger hemorrhages were not found.

The heart, which weighed 320 grams, was dilated in all chambers. There were no evidences of myocardial disease or of syphilitic aortitis. The mediastinal connective tissues were edematous.

The skull showed no changes except for tiny petechiae within the dura mater. The brain weighed 1150 grams and had a normal contour. The large superficial cortical veins as well as the internal white and gray matter were congested, and the piaarachnoid showed old thickenings in many places. Within an old irregular area of softening in the left temporal lobe, a fresh extravasation of blood had taken place.

Pathological Diagnosis: Hemorrhagic edema of lungs; circulatory congestion of liver, spleen and kidney; peripheral edema; petechial hemorrhages in all parts of the body; hemorrhage into the gastro intestinal tract; old area of softening in the left temporal lobe with fresh hemorrhage; obesity; fibromyomata uteri.

COMMENT

This patient was dead of acute hemorrhagic shock seven hours after receiving 0.6 grams of neoarsphenamine intravenously. The circulatory collapse, the generalized hemorrhages, and the rapid appearance of edema fluid in lungs, serous cavities and connective tissue structures demonstrate sudden abnormal permeability in the peripheral vascular bed. The other patients who had received injections of the same remained free from reactions. This fatality, therefore, cannot be attributed to a fault in the drug or to an error in the preparation of the solution, but rather to some acquired constitutional sensitivity.

This patient had never before given evidence of anaphylactic sensitivity to neoarsphenamine on previous injections.

Hemorrhagic shock with severe toxic constitutional symptoms is one of the rarer complications of neoarsphenamine therapy. The number of reported cases is not great, but the condition is more common than published statistics would indicate. Every syphilis clinic has seen similar instances, usually milder and non-fatal. Purpuric hemorrhages may follow the first injection or may appear at any time in the course of short or long series of treatments. Once a patient has had bleeding symptoms following any of the arsphenamines, any further injection is fraught with great danger.

The interested reader will find extensive lists of references in the bibliography appended to this paper.

SUMMARY

This paper describes a toxic neoarsphenamine reaction in a forty-four-year-old syphilitic colored woman. The symptoms of shock, purpura, and pulmonary edema led to a fatal outcome seven hours after the drug was injected.

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METRAZOL

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The following report of fourteen cases of metrazol treatment in the Delaware State Hospital proper is in the nature of a preliminary resume to date and is to be followed by more comprehensive reports later.

Metrazol treatment of course is based on the theory that there is a biologic antagonism between epilepsy and schizophrenia. The induction of an artificial convulsive state by metrazol being as near an approach as has as yet been found to a grand mal attack of true epilepsy. Patients receiving the treatment must have a thorough physical examination and if any gross lesions of the circulatory or renal systems are found they are rejected.

Electrocardiograms are made of all cases selected. Two treatments are given each week, the initial dose in the case of both males and females being 3 cc., except two males who were started with 5 cc. The dose is increased from $\frac{1}{4}$ cc. to $1\frac{1}{2}$ cc. if a convulsion is not obtained.

The ages in the case of the ten males treated ranged from 19 to 34; in the four females 17 to 43. The majority of those treated were frank cases of schizophrenia but there was one female and one male who presented mixed features of both a schizoid and manic depressive nature and one female with a diagnosis of manic depressive, manic type.

Report of cases follows:

J. M.—White male, single, age 29 years. Diagnosis: dementia praecox, paranoid type. This patient had been in the hospital several years previously with a diagnosis of psycho-neurosis and had been discharged as recovered. On readmission the medical certificate stated that he "pulls grass to get electricity." Believed he was going to receive a large sum of money from a large firm of phonograph manufacturers because he sang when he was young. Declared he had 15 wives in heaven and several dead children. Constantly heard his wives talking to him. Metrazol treatment was started on this patient March 14, 1939. The initial dose of 3 cc. produced no results. The second dose of 4 cc. three days later produced a typical convulsion. To date this patient has received 15 injections, the last and largest dose being $8\frac{1}{2}$ cc. To date he has had 13 convulsions. Mental improvement has been negligible. He remains hallucinated and delusional as before.

F. G.—White male, age 25 years. Diagnosis: dementia praecox, functioning at the moron level. Duration of attack previous to admission one year. Has a silly grin on his face most of the time and laughs without reason. Patient was very manneristic, shakes his head and holds it in various positions. Walks in circles and makes queer motions with his arms. Had to be watched to prevent him from constantly throwing water on himself to wash off the effluvia put on him by others. Metrazol treatment started on this patient February 28, 1939, the initial dose being

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3 cc. No convulsions were produced until the 12th injection when this patient received 11 cc. This produced slight twitching movements of the entire body with the head drawn forward. The 13th injection of 12 cc. produced no convulsion, so further treatment was discontinued. No improvement of mental condition.

J. H.—White male, age 26. Diagnosis: dementia praecox, paranoid type. The patient was arrested in the City Building; wanted a warrant for the arrest of the Governor and Attorney General of the State of Delaware. He talked to himself and laughed without reason. Declared that "mind-reader worms" were annoying him; that something like a radio in his abdomen controlled his thoughts. These things might be caused by some organization which he refused to identify. Metrazol treatment started on this patient February 28, 1939, first convulsion on March 3, 1939 when he received 4 cc. Up to May 4, 1939, he had received 17 injections with 9 convulsions, the last dose being 8½ cc. No more treatments were given until May 15 when he received 5 cc. with resulting slight twitching movements of the body lasting not more than two seconds, but no major reaction followed. May 18, 1939, 6 cc. were given with a typical convulsion following, making 10 in all. This patient remains delusional and hallucinated and there has been relatively little improvement.

C. M.—White male, age 21. Diagnosis: dementia praecox, paranoid type. The medical certificate stated the duration was 6 months; that he feared his brain was affected from masturbation. He was markedly delusional and hallucinated at times. He declares it is all caused by the way people look at him. Very impulsive and emotionally shallow. Verbally very unresponsive. Metrazol treatment started April 11, 1939. The initial dose being 5 cc. A typical convulsion resulted. This patient to date has received 11 injections with 10 major convulsive reactions, the sixth injection, dose 6½ cc., resulted in a restless, confused state lasting 45 minutes but no convulsions. The last and largest dose given this patient was 8 cc. There has been slight improvement. He can be induced to

help with some ward work now and has not been impulsive for a long time. He remains verbally unresponsive.

J. C.—White male, age 19. Diagnosis: dementia praecox, paranoid type. Medical certificate states that the patient says that his rectum has been eaten away. Makes threats and secretes weapons; has a paranoid trend towards his family. Intimates he is being poisoned. Says his sexual organs may be responsible. People cause him to masturbate. Metrazol treatment started, the initial dose being 5 cc. with no reaction. Second dose of 6 cc. produced a typical reaction. No more reactions until the dose (5th) reached 8 cc. when a typical reaction resulted. The 6th dose was 8½ cc. with only muscular twitching resulting. The 7th dose of 9 cc. produced no results, while the 8th dose of also 9 cc. produced a typical convulsion. The 9th dose of 9½ cc., resulted in a good reaction. The 10th and 11th doses were each of 10 cc. with typical convulsions. However, the 12th dose of 10 cc. resulted in no reaction. Altogether, 12 injections with 6 major reactions. This patient is moderately improved. Works well in the O. T. class and on the ward. Occasionally slips a little and goes off by himself and laughs and giggles for a short period. However, he is more sociable than he was and very docile.

R. C.—White male, age 34. Diagnosis: Differential: dementia praecox and paranoid condition. Duration before admission, 5 months. Medical certificate stated he was disoriented, depressed, religious trends, reads from right to the left; said he read backwards as people talked. Could not understand other people's conversation. The patient had to be tube fed for many weeks and was mute for several months. Made many attempts to escape. Metrazol treatment was started February 28, 1939 with 3 cc. No reaction produced until the third injection, dose 5 cc. when a typical convulsion resulted. Up to May 8, 1939, 14 injections were given with 8 major reactions. The next treatment was missed and the 15th injection was given on May 15 or one week from the last injection. Now the 14th injection was 9¼ cc. The 15th was only 6½ cc., the dose being chosen arbi-

trarily and a good convulsion resulted. The 16th injection was $6\frac{3}{4}$ cc. with no results. Altogether 16 injections with 9 major reactions. The patient has displayed violent paranoid reactions at various times the past few weeks. These outbursts lasting from a few minutes to several hours. His attitude, however, has improved very much. He will now talk quietly and reasonably about a number of subjects, makes no attempt to elope and has worked about the grounds with only moderate supervision. Laughs and jokes with others and seems to be in much better contact with his environment.

S. S.—White male, age 25. Diagnosis: dementia praecox. Duration 1½ years before admission. Medical certificate stated patient was incoherent and delusional, says, "friends and neighbors are against me." Patient stated that electricity was interfering with him. Believed people were trying to harm him and that the physician was in league with his enemies. Sees a meaning in everything said to him. Was very suspicious of his food. Metrazol treatment started March 3, 1939 with 3 cc. and no reaction. On the 4th injection, dose 5 cc., he had a mild convulsion and 40 seconds later a major convulsion. The 5th injection, dose $5\frac{1}{4}$ cc., he had a major convulsion. The 6th injection, dose $5\frac{2}{5}$ cc., no convulsion. The 7th injection, dose 8 cc., he had a good convulsion. Up to and including May 15, 1939, he has had 17 injections and 12 convulsions. The largest dose $9\frac{1}{2}$ cc. The patient has improved considerably. Is now moderately sociable, most of his paranoid ideas are gone, has a little insight, works well on the ward and his demeanor is friendly.

J. U.—White male, age 25. Diagnosis: dementia praecox, paranoid type. The patient stated that he was very wealthy and his name was that of a deceased multi-millionaire. Went in a local bank and demanded a large sum of money. Hallucinated in the auditory sphere. Finally became mute and untidy, at times impulsive and assaultive. Lacked spontaneity. Metrazol treatment started April 7, 1939 with 3 e. c. and no reaction. Second dose of $5\frac{1}{2}$ e. c. produced no reaction. Third dose of 6 e. c. gave a typical convulsion. Fourth and fifth injections nega-

tive, 6th injection of 8 e. c. resulted in a convulsion. Has had now 13 injections and 9 convulsions. Largest dose 10 e. c. The patient is now quite alert, asks questions and requests work. Eats without urging and is becoming more friendly. Is not assaultive now and has engaged in some outdoor games with other patients.

M. M.—White male, age 21. Diagnosis: a schizo-affective psychosis with features of both a schizophrenia and manie depressive nature. Duration 2 or 3 months before admission, had become worried and depressed. Said he was against his family, inclined to be violent and incoherent. Became very irritable and assaultive shortly after admission and tried to knock others down. Declared he wanted to die. Accused the physician of giving him "T. N. T." and "seven acids." Declared the nurses and attendants had killed his mother. Finally became mute, untidy and had to be tube fed. Very asocial. When taken out for walks would frequently yell "murder" several times in a loud voice, but would say nothing more. Metrazol treatment started March 3, 1939 with 3 e. c. and no results. Second dose 4 e. c. with no results. Third dose of 5 e. c. gave a typical convulsion. Up to May 18, 1939 had 13 injections with six major reactions and two reactions with only momentary twitching. Largest dose given was $6\frac{1}{4}$ e. c. Contrasted with his previous condition this patient has made marked improvement. Is friendly, spontaneous, alert and sociable. Eats and sleeps well and has put on weight. Previously would do no work at all. Now he works well at any task and works until it is finished. He admits that he still hears voices but says that he is confident they will leave him in time and anyway they do not bother him.

G. H.—White male, age 21. Diagnosis: dementia praecox, hebephrenic type. This patient is very silly at times and talks and mutters to himself. Laughs without reason and has been impulsive several times. Often requires cold packs. Believes he is influenced by telepathy and electricity. Is unquestionably delusioned and hallucinated. This patient had insulin in 1938 with only very temporary benefit. Metrazol started March 25,

1939 with 3 c. e. and resulted in a major reaction. Second dose was not increased and he had no reaction. Third dose of 4½ c. e. resulted in a major reaction. Patient had a total of 7 injections with 6 major reactions. Largest dose given was 6 c. e. X-ray of this patient's spine was made 3/28/39 because of reports of compression fractures from other hospitals and not because of any objective sign or complaint of the patient. Evidence of fracture of the 7th, 8th and 9th dorsal vertebrae was found and all treatment stopped. The patient at no time has made any complaint of his injury and there has been no clinical evidence other than the X-ray. Mentally this patient's conduct improved some but he has since become as bad as ever.

L. R.—White female, age 17. Diagnosis: dementia praecox. Duration before admission 1 year. Medical certificate stated that patient is depressed and listless and feels her family is against her. Patient was very inactive and seclusive, never cooperative, psychomotor activity much decreased and retarded, apathetic and listless. Combs her hair over her face and says her face is in the back of her head. Also there is something in her head which is trying to come out. Has been very impulsive at times. Metrazol treatment started April 6, 1939, dose 3.3 c. e. with a typical convulsion. To date has had 10 injections and 10 major reactions. Present condition is slightly improved. Takes more interest in her surroundings, but is still delusional and asocial.

F. H.—White female, age 38. Diagnosis: dementia praecox, catatonic type. This patient was extremely resistive, negativistic, refused to talk, neglected her personal needs and desires and occasionally was combative and destructive. Metrazol started April 14, 1939, dose 3 c. e. with no convulsion. The second dose of 4 c. e. produced slight clonic jerks but no major reaction. The third dose of 5 c. e. produced a typical convulsion. Patient to date has had 10 injections with 8 major reactions, the largest dose given being 6.4 c. e. After the third and fourth convulsions this patient seemed much improved. Was spontaneous, helped some with the ward work and became friendly. As the treat-

ments progressed, however, she began to slip and began to re-exhibit marked paranoid tendencies, so treatment was stopped because it was felt she would not receive any more benefit at this time.

M. J.—White female, age 43. Diagnosis: a schizo-effective psychosis with features of both a schizophrenia and manic depressive psychosis. There are also involutional features in this case. There was a marked distortion of thought content. She believes she is being poisoned, that a "Dr. Gregory" is causing electricity to enter her body and torture her, that he also has clipped her heart with steel and this is going to kill her. Hears voices that tell her many things, particularly of a sexual nature. Very seclusive and lacked interest in things. Metrazol started April 25, 1939 with 3 c. e., no convulsion. Second dose of 4 c. e. with a typical convulsion. To date has received 5 injections with 4 major convulsions. The largest dose to date—4.6 c. e. Patient has made considerable improvement. Is not depressed any more, works well, is friendly and the strength of her delusions and hallucinations have markedly decreased.

M. McC.—White female, age 35. Diagnosis: manic depressive psychosis: manic type. This patient was overactive, irrelevant, overproductive and exhibited some flight of ideas, mood variable, noisy, obscene and untidy. Inclined to be assaultive and destructive. Metrazol treatment started April 25, 1939, dose 3 c. e. with no convulsion. Second dose 4 c. e. with a typical convulsion. To date has had 8 injections with 4 major convulsions and 1 minor convulsion. This patient has improved considerably. Has become friendly and cooperative and in much better touch with her surroundings. Asked permission to attend the O. T. class and then did some nice crocheting. Gets up and dresses herself now. However, she still has periods of confusion and does not remember her sisters' visit two weeks ago.

From the foregoing it will be seen that there is an extreme variability as to dosage even in the same person. It seems that a lapse of one or more treatments leads to increased susceptibility after treatment once

has started. The same dosage will cause convulsions twice or even three times and then have no effect. Some take huge doses with little or no effect and in others small doses produce major reactions. Age seemingly has little effect but the duration of the psychosis does. The earlier the treatment is started the better the results. Then again 4 or 5 treatments produce the best results in some and others require ten or more. Undoubtedly the treatment has to be individualized and nothing but very general rules of procedure can be with any confidence laid down.

The one case of fractured vertebrae out of 15 treated is unfortunate but nevertheless, much lower than the percentages reported from other states.

THE HAZARDS OF CLASSIFICATION Illustrating the Loss of Appreciation of Behavior Factors Liable in Snap- fast Diagnoses

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John is a 14-year-old white boy referred to the clinic because of disobedience, running away from home and habits of stealing. When he was accused of stealing he either denied it or else remained totally indifferent. He had a habit of going around the neighborhood and borrowing small sums of money, saying that his father had sent him. When he was brought into the Juvenile Court the first time he showed no reaction except to say that it looked like a joke. He was sent to the home of a relative as a trial placement but he would not attend school and often stayed out over night. The entire family was insistent that he be sent to the Industrial School. The teacher reported that he never made any effort in the classroom. He was not annoying but just sat idle and looked dumb. Many times he lied without apparent cause.

Investigation revealed that John's misbehavior became conspicuous in the past two years since his mother's death. He was not known to have much affection for his mother but at her death he was grievously upset. He had been allowed to sleep with her whenever his older brother was away. On one such

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occasion he awoke to find her dead beside him. He was terrified and shocked, crying for several days without stopping.

John had always been considered a good boy outside the family. His mother had bathed and dressed him until he was quite large. He was ill tempered and threatening only toward his mother. At one time he struck her. He had revealed no oddities in his behavior at school or in the community. After his mother died he became a persistent truant, shabby in his habits and indifferent to correction. He has shown no interest in the company of other boys.

During interview John remained motionless and unconcerned. He was very quiet, and answered only in indistinct, short sentences. He became tearful when he was pressed for an explanation of his conduct. Sometimes he spoke in such an undertone, that it was hard to understand him. He would not raise his voice even after repeated persuasion. He seemed to suffer dominant moods of lonesomeness and guilt. It was difficult to make any accurate appraisal of his thought content because of his totally blank manner. When he could be engaged in conversation, it was observed that he was adequately appreciative of every aspect of things going on about him. Certain things he explained logically. For instance, he said that he stole the gloves because they were lying up in the bathroom unused for weeks and he was very cold. He said he stole from his step-mother's sister because he wanted a little money. Every time he asked his father for money his step-mother told him not to give it. He said he would like to stay with his father if it were not for his step-mother.

Psychological examination at this time gave the following results:

Terman Vocabulary	CA: 14-7	MA: 11-8	IQ: 80
Stanford Binet		11-9	81
Arthur Performance			
Stanford Paragraph Meaning		17-0	117

Grade: 4.6

Stanford Arithmetic Computation Grade: 4.9

Grade: 4.9

The psychologist reported that "there was a marked contrast in this boy's effort and manner on the verbal tests and on the performance tests. On the verbal tests he was merely passively cooperative, was decidedly lethargic, lacked self-motivated persistence,

and quickly admitted defeat. On the other hand, in the concrete situations of the performance test, he put forth very good effort, exercises good attentional control as a rule, and manifested an adequate degree of self-competition.

The test results indicate that this boy's native intelligence classifies him above the average adult level. However, due to inadequate language development he functions verbally at the dull normal level. This language retardation apparently makes him feel inadequate in any situation where an average level of language expression and comprehension is required. In concrete situations he responds promptly and manifests considerable self-confidence. Analysis of test performances indicates good comprehension and adequate reasoning ability, and practical judgment. Foresight is potentially good, but in complex situations he sometimes responds more or less impulsively and accepts uncritically the first solution suggested by the situation. When this meets with failure he is able to bring judgment to bear upon the problem and to undo his mistakes. However, the latter course does not appear to be a habitual method of procedure with him.

Although John has reached the seventh grade in school, his present academic achievement is at a high fourth grade level. Language retardation apparently made school work difficult for him, and he lacked adequate motivation to overcome his difficulties and to raise his achievements to his potential level. He is potentially capable of completing the eighth grade in academic subjects. However, in view of his language retardation, it would probably be advisable to encourage him to begin mechanical or vocational training since he will be more successful and better adjusted in non-academic work."

At a later psychiatric interview John answered simply with affirmatives and negatives. He says that he is happy, with little show of feeling. He volunteers no information. When he is pressed for information about special features of his misbehavior he lowers his head and sobs. On repeated interviews this has been his usual attitude. He makes no attempt to defend himself or ex-

plain his behavior. He frequently displayed childish smiles and an affected whining speech. Even in neutral settings in the discussion of purely impersonal data, his manner remains the same.

From the observation of reactions during a succession of single interviews, it might be inferred that the boy is suffering a serious mental disorganization with indifference, emotional poverty and inadequacy as salient features. Reports from home and school point to a change in personality at puberty consisting of loss of sense of responsibility, disregard of authority and punishment, neglect of personal hygiene and dilapidation of character. The psychometric pattern reveals a disparity type of intelligence at the above average level with retardation in verbal components.

Here we have a behavior pattern closely resembling that of the schizophrenic with suggestively schizoid reaction on single interviews. In contradiction to this clinical picture there stands the disparity scale of intelligent quotients. It is decidedly against the rule to find this scale of Q's. in dementia praecox even in its early stages. Long before schizoid behavior becomes manifest in pre-psychotics, the intelligence of the subject, as determined by standard batteries of verbal and performance tests, shows a disorganization scale of Q's., namely performance ratings much lower than Binet and Vocabulary ratings. This very fact convinced the examiner that the case was not one of early dementia praecox, and led to the formulation of a program designed to readjust the boy's emotional life and direct daily activities in line with potentialities, acting on the assumption that he was suffering a pure affective disturbance at a stage of adolescent instability. This was done by placing the boy on a farm under stern but sympathetic supervision and providing psychiatric treatment by direct approach, permitting him to re-enact his disappointments and losses in a supportive atmosphere.

The response to treatment was not immediately favorable but over the course of six months John became more expressive and self-revealing. The subject of interpersonal relationships as his family was now constituted

was discussed with him so that he acquired a mature estimate of his place in the group. What was originally suspected to be personal inadequacy and early mental disorganization was actually found to be a reaction of resignation and despair, which followed the initial period of depression over the death of his mother and the early remarriage of his father. This reaction had been paved in early childhood by over-indulgence and poor habit training. The ultimate course of his condition confirms this point. He became a good worker, returned to his own home and for over a year he has been known to be cheerful, sociable, and actively interested in the affairs of the younger set in his neighborhood.

On short time interviews the boy at first exhibited typical feeble-minded responses, totally ineffective in supplying important facts. His progress in school supported this diagnosis. The psychometric, of course, cleared this point. The loss of emotional tone, indifference to correction, unproductiveness and apparent dilapidation suggested the early praecox reaction. The social implications as well as the personality changes seemed so far reaching that the outcome at first looked hopeless. The praecox impression was contradicted by a disparity type of psychometric pattern. Only after prolonged study in many interviews did it become clear that we were dealing with a form of adolescent maladjustment to new family relationships following a reactive depression.

Mack is a 17-year-old white boy referred to the Juvenile Court following arrest in a park for homosexual practices. He had been a mean boy at home. He was destructive, lazy and brutal to other children. He was careless about his habits, wet the bed every night and refused to bathe unless his mother directed every move. By himself he went through many contortions and grimaces before the mirror. He was a persistent masturbator.

Family history reveals that the father was excessively alcoholic and deserted. Mother was supposed to be feeble-minded according to one Binet test.

The first examination of the boy at ten years of age, when he was in the 3-B grade, classified him as adaptable feeble-mindedness

with enuresis, Binet Q 69. Four years ago in the 3-A grade he had a Binet Q of 65. The following year he had a Binet Q of 68 and a performance Q of 82. The psychologist mentioned that the boy's chief difficulty was a reading disability. At the present time the vocabulary and Binet Q's remained the same but the performance Q has gone down from 82 to 64. The examination shows that the boy has deteriorated definitely in his psychomotor intelligence.

In early childhood Mack was frail and undernourished and possibly had rickets. At a preventorium at seven years of age he was so unmanageable and dirty in his habits that he was sent home. During the 1st few years he has become incorrigible in the classroom. Previously he was quiet and adaptable. He would "knit all day long." Lately he has become restless and noisy. He was expelled from school several weeks ago. His mother reported that he has been growing queer for the past year. He strikes and squeezes his younger sister whenever he is alone with her. He rams large pieces of Turkish towels and sponges down the drain pipe when he is washing dishes. He is so lazy that "when he washes dishes he lies in the sink." He tears the lining out of his shoes. He looks at people and then laughs and giggles for no reason at all. He is violently profane and obscene. No one in the family can manage him. When he is sent to his room by way of correction, he jumps up and down on the bed and nearly breaks it. His mother has to wash his face and neck every day. On one occasion she found him dancing around his bedroom dressed in her clothes. His mother is afraid to leave him alone for a minute and wants him committed to some institution.

Seven years ago when the boy was first examined he was described as quiet and bashful. He had an infantile speech and seemed more deficient than formal tests rated him. He caused a little disturbance in the waiting room among other children but during interview was well behaved. Three years ago on psychiatric interview, the boy was polite and attentive. He was immediately responsive. He seemed to take himself very seriously and was accurate in giving information. "He sits

with an alert gaze awaiting the doctor's questions. He holds himself erect. He is not rapid in his speech nor does he express himself in detail but he is accurate and answers to the point." In contrast to his first interview, it was mentioned here that his reactions suggested an intelligence above the level formerly rated by tests. He was observed to be "a little effeminate and retiring." This note on effeminacy at the age of 12 is interesting in view of his later homosexual practices.

The boy's attitudes at present are distinctly abnormal. He bears an immature expression and talks in a tone of submission. There is no spontaneity in speech or action. He cannot be led to talk on any subject. He is evasive about his homosexual practices but under direct questioning he admits the passive role on several occasions with men in the park. He denies sexual relations with girls. He admits masturbation. His inertia is at variance with the grotesque capers which his mother described at home.

Two points of emphasis are made at this time. In the first place, a non-reader's disparity psychometric pattern three years ago, has become, on last examination, an apparently consistent pattern in the feeble-minded level with I. Q.'s 62, 63, and 64. Achievement tests show definite reading disability. There has set in a deterioration in psychomotor ability with a corresponding decline in the performance Q, presenting an apparent consistency in intellectual deficiency. This is obviously only apparent. The conclusions drawn from this psychometric pattern as an indicator of feeble-mindedness are misleading.

The second point of emphasis is that the boy represents in his behavior considerable mental disintegration. He is detached from reality in familiar settings and indulges in grotesque fantasies, acting out these imaginations with all kinds of facial contortions. He is cruel, destructive and lazy. In strange settings he becomes mimical and automatic. He readily yields to homosexual influences. His lack of interest and low achievement, his inadaptability among other children and fantastic imagery are strongly suggestive of schizophrenia. He neglects his hygiene to the

point where he remains dirty for days unless his mother holds and bathes him. His sexual life is inconsistent in yielding easily to homosexual approach and masturbating persistently, yet showing little spontaneity sexually among boys and girls.

The case is interesting in its formulation because of the multiple factors operating here, including psychopathic heredity, neglected habit training, mental disorganization and exposure to destructive sexual influences. With only a spotty review of a few clinical features, the boy might be classified as a feeble-minded non-reader, or as a constitutional psychopath with alcoholic heredity or, schizophrenia. There is considerable proof at some stage of the boy's development in favor of any diagnosis: the psychopath, the early preeox, or the mental defective.

After evaluation of reactions during a succession of interviews including heredity and background items, it is concluded that the boy is suffering a mental disintegration from an early age with mixed intellectual pattern and conflict in instinctual-emotional expression. The boy has a lively imagery without direction. He is erratic in ideation. He has acquired very little integration of sexual impulses in compact personality growth. The weakening of personality, coincident with schizophrenia, made him a ready victim to perversion.

In conclusion, the behavior of children, especially in their maladjustments, is so completely distinctive and individual that classification schemes are of little practical benefit. No information is provided by them for the construction of treatment programs. Classification, by its very nature, requires an elimination of items which, on broader formulation, may be the real keynotes to a solution.

METRAZOL THERAPY IN PSYCHOSES OF DOUBTFUL DIAGNOSIS

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Metrazol convulsive therapy was originally developed as a treatment for dementia praecox, based on observation of the infrequency

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of occurrence of epilepsy and dementia praecox in the same individual. While there have been many reports of excellent results there have been other disappointing reports, certain workers evidently concluding that metrazol alone in typical cases of dementia praecox is of questionable value. The earlier hope that insulin therapy might be supplanted by a simpler, safer and cheaper method has gradually faded. Experience shows that some cases respond better to insulin, some respond to metrazol after insulin has been unsuccessful, some have responded to a combination of alternating insulin and metrazol shocks, while a substantial proportion responds to no form of treatment thus far and remains as a challenge to the ingenuity of physician and chemist in this day of the chemo-therapeutic approach.

The use of metrazol has not been confined to the schizophrenic group or psychoses and reports of many failures within this group are balanced by a growing mass of evidence of its usefulness in other types of psychosis, particularly involutional melancholia and manic depressive psychoses.

In this paper I intend to report results of metrazol therapy in a small group of cases whose diagnoses have not been established to the satisfaction of the staff. They perhaps fit into the classification termed by J. Kasanin (1) the Schizoaffective psychoses and by Hunt and Appel (2) as psychoses lying midway between schizophrenia and manic depressive psychoses. While this very small series will of course prove little as to the efficacy of therapy in the group as a whole, the uniformity of response is at least suggestive that this type of condition is well suited to metrazol therapy.

CASE I—M. W.—Female, white, housewife, age 28. Admitted to the hospital on July 7, 1937. The family history is essentially negative except that the mother is a somewhat unstable, excitable type. The patient is an only child, a high school graduate, who made satisfactory progress though she was not considered brilliant. She was even tempered and socially inclined, she had the usual childhood diseases and had a mild attack of pneumonia at the age of 7. She

had been married for two years. The marriage is said to have been congenial but there was a little friction between the family of the patient and that of the husband. She gave birth to a healthy male child two weeks before admission and there were no serious post-partum effects of a physical nature. During pregnancy she had been somewhat concerned about her condition and shortly before confinement she had seen a motion picture, "Private Worlds" based on the subject of mental hospitals. While in the hospital following delivery she heard another patient discussing the cases of women who had gone insane following childbirth. She steadily grew more and more excited and fearful, accused the nurses of giving her dope and it became necessary to transfer her to the Delaware State Hospital. Upon admission she was agitated and fearful, cooperated poorly, refused to take nourishment and it was necessary to tube feed her. At this time it was noted that her condition was suggestive of a manic state. After about four weeks she became much quieter and seemed deeply depressed, the depression in turn subsided gradually. About three months following admission she began to show symptoms suggestive of a schizophrenic condition, she questioned the identity of her husband and her mother, developed bizarre ideas concerning her body. She believed that her mouth had grown shut, that her jaw was unhinged and expressed the belief that she was not supposed to carry out any of the ordinary activities of existence such as, eating, drinking, talking, sleeping, etc. During the spring of 1938 she had a course of insulin therapy extending over six weeks, with practically no evidence of improvement. She developed the idea that she was dead. She frequently discussed this peculiar idea and at times would agree that it seemed unreasonable that she could actually be dead and still be conscious and active.

On February 22, 1939, metrazol therapy was instituted, there was almost immediate improvement. The attitude of anxiety and hesitation disappeared. She spoke of a diminution in her feeling of unreality. She began to accept her husband and her relatives as real, ceased to express the idea that

she was dead and that she was not supposed to do ordinary things. After eight major convulsions, the course was discontinued. The marked improvement has persisted and she shows fair retrospective insight, her attitude toward her husband and child are quite normal. She is considered recovered.

CASE II—M. L.—Female, white, housewife, age 26, admitted to the hospital October 5, 1936. She was always extremely dependent upon her parents, had difficulty in making friends and disliked social activities. She was married to a man 12 years her senior, there have been no pregnancies. There was serious friction between the patient's parents and that of the husband. Shortly before admission she apparently developed an attachment for a man who was practically a stranger, soon afterward she became fearful, talked in a rambling manner and expressed the idea that some imaginary persons intended to harm her. On admission she was seclusive, restless, almost inaccessible to reasoning, was obviously suspicious and made many aggressive attempts to escape. She believed that speeches on the radio referred to her and she declared that a nurse and an attendant were plotting to kill her. There were frequently evidences of auditory hallucinations extending over a considerable period of time. She made two or three half-hearted suicidal gestures. In attempting a diagnosis it was noted that there were symptoms of schizophrenic character together with some of a psychoneurotic type, an anxiety reaction being quite prominent. A tentative diagnosis was made of schizophrenia. There was very slow improvement and after six months in the hospital she was paroled as improved. She was unable to adjust satisfactorily at home, however. She was constantly suspicious, at times she believed that attempts were being made to poison her, she talked about a love affair which evidently was pure fantasy, she was returned to the hospital November 30, 1938. Her condition on readmission was somewhat similar to that on first admission except that anxiety symptoms were more prominent and delusions and hallucinations were less evident. During her second residence in the hospital she showed little promise of

improvement. On March 13, 1939, metrazol was started. Almost immediately the anxiety state subsided. After nine convulsions the treatment was discontinued and during the month since treatments were terminated, the patient has seemed entirely normal within the limits of her strongly introverted personality.

CASE III—W. K.—Male, German-Russian extraction, age 18, admitted to the hospital on September 23, 1938. No family history of mental or nervous diseases. The patient is the third of four siblings, he completed the eighth grade at 16 when he discontinued school to go to work. He was always shy and quiet, never inclined to discuss his feelings with members of his own family. He showed little interest in the opposite sex. After quitting school he had difficulty in obtaining employment, he finally found a job which lasted for six months and since then he had been unable to obtain further work. He worried a great deal and developed feelings of inferiority. One week before admission his sister found him sitting rigidly staring into space and when she spoke to him he did not appear to recognize her. He became apathetic, doing only things he was specifically directed to do, his appetite became poor and he lost weight, he developed vague feelings of anxiety and of impending disaster. On admission to the hospital he was abstracted, frequently did not respond to questions, responses when obtained were retarded. He spoke of strange thoughts and stated that his heart seemed to speak to him, he was often obviously apprehensive, spoke of having killed God and of having caused everybody to sin. He expressed the belief that all of his family were dead. He exhibited various peculiarities of behavior, once while smoking a cigarette he suddenly swallowed the lighted cigarette. Several times he got into the bathtub fully clothed. There appeared to be a slight degree of insight, the patient expressing the idea that there was something wrong but he was unable to express the feeling adequately in words. There were periods of improvement but these were never of great duration. This patient is of a definitely introverted personality type. His psychosis had a strong depressive coloring,

with delusions and behavior suggestive of dementia praecox. He was placed on a differential diagnosis between manie depressive psychosis and dementia praecox. On February 28, 1939, metrazol therapy was instituted. There was immediate improvement, the improvement being greatest immediately after each treatment with some tendency to slip back into his previous state before the next treatment. The improvement has gradually grown more sustained until after 18 convulsions, the patient is able to make a satisfactory social adjustment and except for some anxiety connected with the treatment itself, he shows little evidence of psychosis.

CASE IV—P. W.—Female, white, school teacher, age 27, admitted to the hospital January 16, 1939. The patient was born in Poland. Both parents died when she was young, she was brought to the United States when seven years of age by a maternal aunt. She overcame many obstacles to educate herself and prepare herself for teaching. She taught school in Pennsylvania but was excessively conscientious and made her work more difficult than necessary. She was never sociable but preferred the society of men to that of women, she was married nine months before admission to the hospital. The husband is a year her junior and she is quite sensitive to the fact. Contraceptive measures were used and this was evidently a source of some conflict in the mind of the patient. About four years before admission she began to complain of a pain in her abdomen, this pain was of an indefinite type and tended to wander about over her body. She consulted numerous physicians and was never satisfied with the treatment received from any of them. About six weeks before admission she began talking irrationally and became so excited that she required a sedative. Arrangements were immediately made for her to discontinue her teaching. She was kept at home and protected from publicity until her admission to the hospital. When admitted she was obviously suspicious, expressed the belief that the physician was mentally abnormal, she was seclusive and there was great difficulty in persuading her to take part in organized activities. She complained frequently of

pain in various parts of her body but in her expression there was little evidence of actual discomfort. She believed that she was being constantly observed by the other patients and that she was an object of experimentation. She became steadily more inactive and finally became almost inaccessible. Although her earlier symptoms were somewhat suggestive of a psychoneurotic condition, her personality was definitely schizophrenic and the development of her psychosis under observation, suggested dementia praecox of simple type. On April 3, 1939, metrazol therapy was instituted, there was immediate improvement with a tendency to return to her previous state between treatments. Improvement has gradually become more and more permanent and at present after 13 treatments there is no tendency to regression between successive administrations. The patient is active and spontaneous, seldom complains without actual reason and is considered as recovered.

In addition to these four cases two others have received metrazol therapy in the Observation Clinic. One of these, an unmarried woman, 36 years of age has a psychosis of at least 10 years standing. This psychosis began with symptoms and behavior suggestive of a manie state. Later manifestations were fairly typical of a schizophrenic reaction with bizarre somatic delusions and occasional auditory hallucinations. There have been periodic exacerbations and partial remissions but never a return to a normal mental state. Metrazol therapy was started during the more severe phase of her psychotic cycle. There has been steady improvement during the course of treatment. Her present condition, however, is no better than during previous spontaneous remissions and in this case the influence of the treatment must be discounted. This, however, is another case of somewhat doubtful diagnosis, which particularly in the earlier stages was intermediate between dementia praecox and manie depressive psychosis.

The sixth case, is that of an unmarried stenographer, admitted at the age of 22 with a history of introversion and of gradual development of definite psychotic behavior for a year preceding admission. She exhibited

selusiveness, habit deterioration, suspicion and delusions of persecution. For months she was tube fed. This case was diagnosed dementia praecox, paranoid type. Metrazol therapy was instituted on February 22, 1939 and 22 treatments have been given, thus far with no evidence of improvement.

SUMMARY

In a series of six cases, subjected to metrazol shock therapy, five have been diagnostic problems, having shown symptoms of manic depressive psychosis in addition to those of dementia praecox. The sixth was typically schizophrenic. Four of the five cases showing symptoms of an intermediate character have recovered or remarkably improved. The fifth case of long standing is better but the improvement cannot justly be attributed to metrazol. The one typical case of dementia praecox in the series remains unimproved.

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MYELOMATOSIS

A Clinical Observation

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The multiplicity of organs affected in any possible disease process requires the physician to look out for a cardinal factor. Such is the case in endocrinopathies, in diseases of the hemic system, in tumor metastases, in generalized infections. Systemic diseases like myelomatosis become provoking problems to the diagnostician by causing secondary symptoms from which the original disease may be traced with some difficulty. The case of multiple myeloma which is presented here will also demonstrate how little or how much anamnestic data may be of value in the accurate determination of the causative factor, among a confusing variety of data.

The family history of this patient appears irrelevant to his illness. He was born in 1889 in Pennsylvania, attended country school, probably completing the grammar grades. He was described as fairly intelligent. He held jobs as telegraph operator, taxi driver and farm hand. Strong intemper-

ance was a continual source of difficulties in private and professional adjustments.

Among early physical antecedents, an attack of typhoid fever at the age of 11 years and a fracture of the clavicle may be noted.

During the year prior to admission two outstanding features became apparent. His head showed a marked shaking whenever he seemed especially worried or excited. And some time in February, 1938, he complained of having hurt his back while chopping wood, and his pain had remained ever since. From then on, he has been unable to lie flat on his back.

After consulting various doctors and a chiropractor without obtaining relief, he finally accepted the advice of a physician to have himself admitted to a hospital where he was observed for a period of eight weeks. Up to that time he had suffered a gradual loss of physical strength to a point that he was hardly able to feed himself any longer on account of his poor grip.

The hospital reported that patient had been treated with mercurial ointment for lumbar pains at the time of their first appearance and apparently improved. In July, 1938, he had a relapse, and about three weeks passed before he was admitted as a patient. It was stated that then "he was unable to walk without assistance." The neurological findings: irregular pupils, hyperactive tendon reflexes, slight tremor of hands and legs, bilaterally positive Kernig sign and some impairment of skin sensation, in the presence of positive serological reactions, lead to a tentative diagnosis of tabes dorsalis. Spinal fluid examination, however, showed entirely negative test results. Antiluetic treatment with potassium iodide and neoarsphenamine was started. He left the hospital upon his own request. On his return home, it was noticed that he had difficulty in breathing, namely that he "wheezed," and complained of a pain in his back and chest. After he was home a week, he seemed a little stronger, but soon he grew weaker again, and he was bedridden thereafter. During the two weeks before his commitment to the Delaware State Hospital, he complained that the pain in his chest and back seemed to travel all over his body. To

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his family he appeared mentally normal though during his previous hospitalization tenseness and partial orientation defects as to time and events were believed to be noticeable.

On admission, September 23, 1938, the patient, a 48-year-old white man, was found in a considerably reduced nutritional state, and of pale anemic complexion. His teeth were in poor condition. The tongue was somewhat coated. There was a moderate dyspnea. B. P. 150/110. Heart showed nothing abnormal. Extensive dullness over the left lower and middle field of the lung. Numerous crepitant rales in the left upper field, particularly in the subclavicular zone, with a bronchial type of respiration. The abdominal walls were easily palpable, without any tenderness or resistance. There were subjective complaints of pain in the back between the shoulders and of pain in the stomach groove. He seemed to be in considerable pain at any movement.

Neurological status: Pupils large, equal in size, reacting poorly and sluggishly to light. Occasional head tremor. Marked fluttering of the eyelids and tremor of the tongue.

Muscular strength appeared to be moderately decreased in all extremities, but mainly in the legs. He was unable to walk without support, and fell immediately when let alone. There was a marked tremor of the outspread fingers. When attempting to keep himself in sitting position, he showed considerable tremors of the trunk and shoulder girdle musculature (in trapezius, etc.).

The arm tendon reflexes were active and equally developed. Mayer bilaterally active. Spastic finger signs present on both sides. Positive umbilical and cremasteric reflexes. Plantar reflexes active on both sides. Oppenheim marked by abnormal toe reactions on both sides, an abduction of the fifth toe being noticed on the right. There was bilateral dorsiflexion of the toes following active flexion of one or the other knee against passive resistance.

The original neurological findings were interpreted as an encephalitic reaction, possibly neuro-syphilis.

Laboratory test results: There was a sec-

ondary type of anemia with 4,110,000 red cells and 69% hemoglobin. Leucocyte count 7,800, with 36% lymphocytes, 4% monocytes and 60% neutrophiles which were not differentiated. Blood sugar 111. Blood urea 15. The predominantly alkaline urine, with an average specific gravity of 1.019, showed a marked protein content, some finely granular casts, triple phosphate crystals and rare epithelial cells. P. S. P. test—normal. The Kolmer-Wassermann reaction was strong, the Kahn reaction moderately positive in the blood. The spinal fluid was clear. Cell count 21. Globulin markedly increased. Sugar content normal. Pressure 24. Kolmer-Wassermann negative. Colloidal gold curve flat.

An x-ray of the chest was interpreted as giving evidence of a left-sided empyema. Thoracocentesis revealed a yellowish exudate, clotting in the tube, containing many mononucleated cells, no visible bacteria. Culture: sterile after 48 hours.

The following chronological enumeration of the most important observations will serve to demonstrate the clinical development and the diagnostic progress.

10-18-38. Patient pretends to have unbearable pains in his back whenever attempting to move. He prefers to lie in recumbent position and does not attempt to turn to one or the other side. He complains of severe pains in his arms at night.

10-26-38. Very small amounts of exudate found in the right pleural cavity; 150 cc. removed from the left side of the chest.

11-3-38. The lung tissue believed to be rentgenologically free from any organic lesion in spite of the persisting bilateral exudate.

11-8-38. Patient keeps his head rather stiffly in a bent-forward position, appears disinclined to relax and, whenever trying to do it, is complaining of increased pain.

11-14-38. Bladder retention relieved by catheterization; 36 oz. of a clear urine obtained. B. P. 120/80. Rectal examination negative.

11-17-38. Marked dyspnea. Right pupil smaller than the left one. Right eyeball shows a moderate degree of relative exophthalmus. Tendon reflexes still active on

the left arm, somewhat feeble on the right arm. Spastic finger signs markedly developed on the left side, none on the right. Tendon reflexes on the lower extremities absent on the right side. Plantar reflexes: doubtful on the left, absent on the right side. No pyramidal signs on the lower extremities. Increased generalized muscular flaccidity. Tentative diagnosis of a newly developing cervical cord lesion (Horner syndrome). Urinary retention continues. Bladder irrigation recovers a large amount of greenish, gelatinous matter. The urine contains many pus cells and few erythrocytes. Blood urea 21. Urinary output decreasing.

- 11-18-38. Bony lump on sternum detected.
- 11-19-38. Increased dyspnea, drowsiness.
- 11-21-38. Bence-Jones protein positive in urine.

11-28-38. Patient expiring, under signs of circulatory collapse during the early part of the night.

The diagnosis of myelomatosis was arrived at on the basis of a fairly typical history with sudden onset following exertion, (b) pseudotabetic complaints of varying intensity, (c) periods of remission and exacerbation, (d) a spastic tetraplegia, with lack of a clearly determined sensory element apart from the constant, though changing pain reactions suggesting radicular irritation, (e) the presence of pleura exudate without definite lung tissue defect, (f) a kidney affection with Bence-Jones protein in the urine and no rise of blood pressure, (g) the appearance of clearly visible bone lumps (sternum). Of particular interest is the right-sided cervical spinal syndrome, supervening within a relatively short time and, together with the urinary retention, presaging the fatal end.

As pointed out by Ballard, multiple myeloma remains often "unrecognized until discovered at autopsy." Obviously the correct diagnosis will, in many cases of this type, largely depend on the impressiveness of the clinical picture. A mixture of neurological, thoracic, skeletal and renal symptoms will not necessarily call for a common determinant unless the observer feels inclined to believe more firmly in the interdependence and asso-

ciability of clinical signs which do not blend well on first sight.

The diagnosis will become more difficult in cases presenting a rudimentary development of the pathological substratum.

As to the neurological symptoms produced by myelomatosis, new light has been thrown on their interpretation by T. Scheinker in a recent study. According to this author, lesions may be set by mechanical influences exerted by tumor expansion or by toxic factors linked with metabolic changes, anemia and cachexia.

In view of the fact that our post mortem studies have not been completed at this moment, we merely want to mention that the cervical cord lesion, suspected in our case, was confirmed at autopsy and that an area of extensive myelomalacia was found.

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THE NEED FOR REORIENTATION IN THE CLASSIFICATION OF THE ENDOCRINOPATHIES

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Endocrinology has become a serious problem child of modern medical research. A feeble infant at its birth a few decades ago, it has reached adolescence and is making a vigorous struggle for emancipation from charlatanism by demonstrating the importance of the incretory glands in controlling the basic mechanisms of life.

It is a biological truism that each and every individual cell in an organism is capable of maintaining an individual existence. But the more complex an organism has become, the more have its cells become differentiated according to their special functions and are found grouped into various types of tissues, all dependent upon harmonious interaction for the maintenance of normal functioning of the organism. The endocrine glands, in particular, are quickly thrown into an imbalance by a disturbance in the function of any one gland. The reciprocal relationship between the cortex of the adrenal gland and the an-

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terior lobe of the pituitary body is well known; a depressed or increased function in the one is followed by a similar reaction in the other. The ablation of one endocrine gland is usually followed by changes in structures and functional activity of the remaining endocrine glands. This does not mean, however, that the removal of any one endocrine gland directly affects or controls the others; rather, the subsequent changes in the endocrine bodies are usually brought about by the effect of altered body activity. Too frequently this secondary effect on the remaining glands which results from the disturbed function in one gland is misinterpreted and the conclusion is reached that the affected gland controls the others. The logical outcome of such reasoning has led to the assumption of the existence of hormones which probably are only hypothetical entities. Furthermore, the endocrine glands, like all other organs in the body, are under the control of the nervous system, the function of which is to release and coordinate energy. An endocrinopathy may be primarily attributed to disease, for instance, of the sympathetic nervous system and thus present a neuro-glandular syndrome such as is seen in exophthalmic goiter. The endocrine glands do not initiate activity but respond to impulses brought via the sympathetic and central nervous system by coordinating the speed with which the body cells react.

The pituitary gland is not essential to life, yet its removal produces profound changes and dysfunctions either directly or indirectly in the remaining endocrine glands and in almost every, if not every, organ in the body. So dependent are the endocrine glands for normal functioning on an intact pituitary body that it is now unanimously recognized as the "general headquarters" or the "orchestra leader" of the secretory system. Enthusiasm and a failure to correctly analyze the mechanisms by which a change in function has been produced, has created a multiplicity of hormones, especially of the anterior pituitary lobe. Koch formulated criteria for the identification of the specific organisms producing various infectious diseases and his example might well be emulated in classifying the endocrinopathies.

The number of active principles produced by the anterior pituitary lobe is still debatable. As many as eleven hormones are ascribed to the activity of this body:

1. The growth hormone.
2. The sex-stimulating hormone. This hormone is believed to be bipartite, consisting of a follicle-maturing fraction and a luteinizing fraction.
3. The thyrotropic hormone.
4. The adrenotropic hormone.
5. The lactogenic hormone.
6. The diabetogenic hormone.
7. A pancreatotropic hormone.
8. A hormone regulating nitrogen metabolism.
9. A hormone regulating fat metabolism.
10. A parathyrotropic hormone.
11. Possibly a hormone governing erythropoiesis.

The more conservative endocrinologists commit themselves to the belief that one can be sure of the existence of only six or seven of these hormones.

The so-called growth hormone has been the subject of particular interest and for a time its existence was unquestioned. True, it produced the growth response. But Riddle and his co-workers were able to show that the same result could be obtained by other products. It is a well-established fact that even crude extracts of the anterior pituitary lobe will easily bring about a growth response in many animals. Riddle and his co-workers have shown that there are two anterior pituitary hormones which are capable of raising the metabolic rate in doves and pigeons, provided the tests are carried out at the critical temperature of these animals, the thyrotropic hormone and prolactin. Both principles alone will produce growth in some animals.

Experiments have also been carried out on dwarf mice. In these mice the eosinophile cells of the anterior pituitary lobe are absent. They grow to about 6 or 8 grams while mice with an intact pituitary gland reach the usual weight of 25 or 30 grams. When these animals are given either thyrotropic hormone, dessicated thyroid gland or combined thyrotropic hormone and prolactin they show a growth response, even reaching 25 or 30

grams. These hormones have been shown to produce the change in the metabolic rate by their action on various organs of the body. The thyrotropic hormone is active only in the presence of the thyroid gland while prolactin produces its effect in its absence. It is irrefutable that these two hormones can bring about the same growth response ascribed especially to the "growth hormone." The experimental evidence strongly indicates that the growth occasioned by the preparations of the "growth hormone" is due to the presence of the thyrotropic hormone or prolactin or both.

The presence of a gonad-stimulating hormone in the anterior lobe has been satisfactorily demonstrated, though there is still some doubt whether a separation from the thyrotropic factor has been achieved. Riddle makes the statement: "In our laboratory we are sure of only three anterior pituitary hormones—thyrotropic, follicle-stimulating, and prolactin. We are not sure of any other single one."

Since it is apparent that so many metabolic processes are modified by anterior pituitary factors we must ask ourselves how it is possible to dissociate pituitary functions. It happens that interference with one type of glandular activity does not necessarily interfere with the other activities of the gland; for example, an adolescent child may be stunted in growth yet sexual development may be proceeding normally. The old terminology of hyperpituitarism or hypopituitarism has therefore become meaningless as well as misleading, since one of its hormones may be deficient while another may be produced in excess or unchanged in quantity or quality.

Again, a syndrome may be ascribed to a glandular dysfunction, yet adequate evidence be lacking for such an assumption. Frohlich's syndrome or adiposogenital dystrophy is a case in point. It has been found that a similar condition can be produced in animals with an intact pituitary body by a lesion in the hypothalamus and recent research points strongly toward pathology in the latter area as the causative factor in the production of this syndrome.

Too many conclusions are being drawn

from the results of experimental work with the use of impure products. Only the experimental data obtained when chemically pure substances have been employed can be valid and those results are brought about as part of the biochemical reactions set in motion by the particular hormone being investigated. Stunted growth does not necessarily indicate either a "typical thyroid" or a "typical pituitary ease," or gigantism a "typical pituitary" or a "typical hypogonadal ease."

Symptoms must be interpreted not in terms of hyperfunction or hypofunction of any one or several endocrine glands, but must be correlated with a knowledge of the biochemical processes producing the symptoms. Only thus can the physician avoid prescribing expensive hormone therapy which may not only not benefit his patient but actually do harm.

METRAZOL TREATMENT

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The basis for treating schizophrenia by metrazol was suggested by Von Meduna on the assumption that an apparent biologic antagonism between epilepsy and schizophrenia exists. Von Angell offers a theoretical explanation for the mode of operation of metrazol in the treatment of schizophrenia. He postulates that various portions of the higher association areas of Flechsig do not reach maturity in the brains of schizophrenic patients and hence are vulnerable to both endogenous and exogenous toxic agents. It is suggested that metrazol produces an initial ischemia in the vulnerable cortical areas which is followed by a compensatory hyperemia with increased oxygenation. Many research workers found that schizophrenia is associated with a low rate of oxygen consumption and relatively sluggish autonomic activity. According to Meduna it is possible to theorize that the medullary irritation with resultant respiratory, vasomotor and autonomic responses is the basis of the metrazol convulsive therapy. At the same time Von Meduna came to the conclusion that metrazol acts primarily as an ectodermotropic drug by

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direct cellular action. Pathologic examination of animals deliberately poisoned with metrazol by Von Meduna shows diffuse cellular changes most prominent in the medulla and then in order of severity in the cells of the spinal cord, mid-brain and cortex.

Metrazol is administered intravenously early—before the usual breakfast hour. As a rule the first dose is started with 3 to 5 c. c. in 10% solution. The male patients receive a slightly larger dose than the female patients. If the patient has a convulsive seizure, the same dose is repeated during the next treatment, and if a convulsive seizure does not follow almost immediately a small dose is added. The treatments may be given daily but usually it is preferred to give them from 3 to 2 times a week. Previous to instituting the treatments, the patient undergoes a careful physical examination including x-rays of his lungs, heart, vertebrae. Electrocardiograms are also taken. Patients who suffer from infectious diseases, pulmonary tuberculosis, cardio-renal disease, arteriosclerosis with hypertension, pregnancy, are exempt from treatments. The injection is given intravenously and very rapidly and frequently the vein becomes thrombosed which is a great disadvantage for this mode of treatment. During the treatment with the aid of cinematographic and kymographic tracings, the following series of events were observed in the motor pattern of the convulsion: Two to five seconds after intravenous administration of metrazol the patient coughs and five seconds later a marked pallor of the face occurs. Three to ten seconds after the injection an intense blepharospasm occurs and the facial expression is a mixture of bewilderment and fear. Five seconds later myoclonic convulsive movements begin in the face, shoulders and arms, sometimes only on one side. A well marked rhythmic clonic phase develops. After about 15 seconds a tonic phase ensues. The head is retracted and the back is arched. The eyeballs may move upward or to either side or remain in the original plane. The arms and legs are tetanically contracted in extension. The wrists and fingers are flexed, the position of the thumb frequently being between the index and the middle finger. Sometimes be-

fore opisthotonus develops there is flexion of the thighs, legs and feet with the large toes in Babinsky position. This is followed by an extension of the lower extremities. Frequently there is an adduction spasm with the legs in a scissor like position. These positions of the body may change during the tonic phase; the knees may be flexed on one side and extended on the other. There may be a rotation of the pelvis to one or the other side with flexion of the thighs and legs, followed by extension. Similarly, the upper extremities may assume various postures. The tonic phase lasts from 5 to 30 seconds and is followed by another clonic phase. The first clonic movement appears in the fingers and spreads to involve the entire body. Such rhythmic clonic movements are seen while the extremities are still held in tonic extension. The clonic movements are at first rapid, gradually becoming less frequent with increasing amplitude and close after about 25 seconds. During this stage ejaculation may occur. Urination is observed after relaxation. During the tonic phase and the succeeding clonic one there is a period of apnea with marked cyanosis. After a few seconds the patient resumes breathing. A pilomotor reaction is present during the tonic phase and gradually disappears during the apneic period. Sometimes the lower extremities and often the upper extremities are rigidly extended after the second clonic phase. After the convulsion, the patient is frequently drowsy and may fall asleep. About 10 minutes after the last clonic phase a period of restlessness may occur. The patient may thrash his arms about or there may be a definite pattern of movements such as falling or the body to the side. About five minutes after the injection the patient's attention may be attracted by verbal stimuli. As a rule each individual has his own constant pattern. The patient may show motor restlessness immediately before his first clonic phase, such as flopping his arms, as in wing beating, brushing his face or alternately raising or lowering his legs. In most cases there is a short period of areflexia soon after the convulsion, which is followed in a few seconds by increased deep reflexes, sustained ankle clonus and the Babinsky sign.

Usually there is a short period of confusion after the seizure; in some cases it lasts several hours. The patient has a total amnesia for the phenomena, recalling only the injection and the feeling of anxiety. The pupils are dilated during the convulsion and do not react to light; in some cases there is a profuse perspiration after the convulsion. The blood pressure rises from 20 to 60 Hg. mfm. during the convulsion and drops to normal in 20 or 30 minutes. The motor pattern of convulsion produced by metrazol differs from that produced by other convulsant drugs in that its pattern follows a clonic-tonic-clonic sequence and indicates a complete and intensive reaction of the nervous system. Camphor, monobromide, thujone, pierotoxin and insulin produce only clonic convulsions and occasionally tonic-clonic convulsions. In the absence of a convulsive seizure, patients show motor restlessness, tachycardia, accelerated breathing, flushing and they are in an anxiety state or twilight state. During these states patients are hallucinated and they have a feeling of impending death. By giving a proper dose this stage may be prevented.

Who should be treated by metrazol? Pollar and Strecker state that throughout the world up to May, 1938, over 2000 patients had been treated by insulin hypoglycemia and 600 with metrazol convulsions. The effectiveness of these methods appears to vary with the type of schizophrenia. The patients with hebephrenia and simple type respond poorly to either form of treatment. Insulin appears to give the best results in patients with catatonic excitement and paranoid form, while those with stupor respond best to metrazol. Meduna disagrees with this opinion and he advises to treat all early cases of schizophrenia regardless of type by insulin or metrazol. He states that the treatment is not specific and one has to try out in case he does not succeed with the insulin shock therapy—the convulsive irritative form of treatment. Erbe treated 12 patients unsuccessfully with insulin for 9 weeks, a complete remission was obtained in 7 cases after an average of 5 convulsions were induced by cardiazol. In each case, however, insulin was again administered before treatment was stopped. Treatment of 17 pa-

ents with metrazol led to 4 remissions and 10 improvements; but subsequent administration of insulin led to recovery in 6 who had previously merely improved. H. H. Goldstein, E. F. Dombrowski, J. V. Edlin administered metrazol treatments to 10 patients who remained unbenefited. However, by treatment with insulin hypoglycemia, five (50%) recovered and one patient improved.

Sakel states, "Where patients make little progress from wet shocks (coma) and the same patient shows improvement after a dry shock (hypoglycemia convulsion in 2 or 3 hours after insulin is administered) or in cases which are more likely to respond more favorably to dry shock than to wet, we would like to encourage the dry shocks. This can be accomplished by administration of metrazol in 2 or 3 hours following the use of insulin—in other words when early spontaneous hypoglycemia epileptic convulsions occur.

At present mixed various methods of treatment with insulin and metrazol are used. Meduna presents statistical data in regard to treatment in metrazol.

Total number of cases from

37 hospitals and clinics 1465

Total number of full re-

missions 290 or 19.86%

Total number improved 564 or 38.43%

Acute type (under 6 mo.)... 210

Number of remissions 128 or 60.95%

Number of improved 42 20.00%

Subacute type (between sixth

month and one year) ... 201

Number of remissions 74 or 36.82%

Number improved 47 or 23.13%

Chronic type (over 1 year)

Number of remissions 88 or 8.36%

Number improved 398 or 37.7%

Finkelman, Sternberg at the Elgin, Ill., State Hospital treated 66 patients with metrazol and sustained remission in 88% of patients who were less than six months. They concluded that the rate of remission is almost inversely proportional to the duration of the psychosis. If the psychosis has lasted more than 3 years the anticipation of remission is slight. Patients who showed a remission though their psychosis was over 18 months in duration required larger doses of the con-

vulsant drug and a greater number of convulsions. The type of dementia praecox that shows the greatest tendency to remit with this therapy is catatonic, followed closely by the paranoid. In addition we may mention that certain types of depressive psychosis have been treated successfully by metrazol therapy. Meduna collected 109 cases of functional psychosis treated in different hospitals by metrazol and from them 80 improved and recovered—29 remained unimproved. Richard H. Young of Omaha treated a group of 21 depressed patients by metrazol. He noted an improvement in all but one who was 54 years of age and actually not depressed. The average number of convulsions received by these patients was 7. The average number of treatments was 21.6.

Eleven colored patients were treated with metrazol at the Delaware State Hospital, two had psychosis of fairly short duration. In nine of them the psychosis is chronic, and the duration varies from 2 to 13 years.

The youngest female patient is M. C., 21 years of age, admitted to the hospital December 16, 1938; diagnosis Dementia Praecox, paranoid type. Duration 6 months. The patient displayed manneristic symptoms, was negativistic, expressed vague ideas of influence. She was uncommunicative, unkempt and was a feeding problem with 16 convulsive seizures. The largest dose given was 7.5 c. c. In the beginning patient cooperated well in the treatments. She showed a marked improvement, became more alert, showed some social tendencies, worked with O. T. class. Now patient is very contrary and resistive before each treatment. She uses vile language, screams, shouts and shows assaultive tendencies. She does not have any insight, still expresses ideas of influence, states that she does not need mercury shots; she sees strange marks on the skin of her body.

Patient S. is 45 years of age, married. Date of admission June, 1938. Onset of psychosis, December, 1937. Diagnosis: Differential between Paranoid Condition and Paranoid Dementia Praecox. Patient has demanded money from the woman who employed her, claiming that the husband of this woman bequeathed her \$4,000. Patient also claimed

that her own uncle left her money. She annoyed many people by writing letters, and made threats to kill the guilty. While in the hospital she became extremely paranoid toward the nurse, accused her of having affairs with her husband and of having collected her money. She was frequently agitated and excited. Her demands now were in millions of dollars. Patient had 15 metrazol injections with 9 major convulsive seizures. She was extremely resistive and tense before each treatment and on several occasions her blood pressure rose to 180/90. The pacified effect of the convulsions lasted only for a short while, and then she became very apprehensive, accusatory, expressed the same type of delusions as before the treatment and admitted hearing voices of spirits who told her that her husband and son were dead. She started to miss meals. She definitely declared that the treatments are given by physician, who is under the influence of the nurse who plots against her life. Patient's treatments were discontinued.

Two sisters, N. G. and F. H., were given the treatment. N. G. is 45 years of age and was admitted March 15, 1935. Diagnosis: Paranoid Condition. Duration of psychosis 5 years. Patient was extremely hallucinated in auditory and visual spheres, expressed ideas of influence and reference. She was for long periods of time extremely noisy and disturbed. Orientation and memory were always good. Patient had 19 metrazol treatments, and had during each treatment a major convulsive seizure. Patient was cooperative up to the eleventh treatment; she became friendly and did not express any delusions. After the eleventh treatment she began resisting before each treatment, expressed the same bizarre delusions of a paranoid nature as before the treatments were started. Although the treatments are continued, the prognosis in her case is not favorable as her disease has been of long standing and her hereditary stock is of an inferior nature.

The younger sister, F. H., is 38 years of age, was admitted February 2, 1927. Duration of the psychosis 13 years. Diagnosis is Dementia Praecox, paranoid type. Patient was extremely autistic, expressed paranoid

delusions, became childish in her behavior and hallucinated. She had 23 metrazol treatments with 22 convulsive seizures which did not cause any change in her behavior.

E. P. is 30 years of age, was admitted March 25, 1930. Duration of her psychosis is 13 years. Diagnosis: Dementia Praecox, hebephrenic type. Patient was emotionally blunt, silly, listless, disoriented to time, unkempt. She had 19 treatments with 13 convulsive seizures, so far without any benefit. Recently she exhibited a new spontaneity by approaching the physician and requesting him to discontinue the injections because they made her nervous.

K. P., age 33, married, was admitted April, 1937. Diagnosis: Dementia Praecox, Paranoid type. Since her illness patient was incoherent, uncommunicative, asocial, quarrelsome, frequently remained in her room, refused to mingle with other patients. Patient had 24 metrazol treatments with 20 convulsive seizures and showed a definite, favorable change in her behavior. She is friendlier, greets physician on every occasion, is coherent, relevant, but she still lacks spontaneity and does not have any insight. She maintains that she always was nervous and she has no business to remain in this place which she does not like.

C. H., age 39 years, admitted December 20, 1938. Duration of illness since December 12, 1938. Patient was depressed on admission, became mute, resistive, untidy and had to be tube fed and taken care of. Diagnosis: Manic Depressive Psychosis, Depressed type. Patient broke her silence after her first metrazol injection. She stated that she does not talk because the people in the ward talk a different language than she. She expressed her willingness to learn the language. She asked to be allowed to return to Florida. She doubted if she is in a hospital. On the following day patient attempted to help with the ward work—showing that she is like the other people about her. She still appeared negligent in appearance and had to be urged to eat. After the 8th treatment patient started to eat by herself under supervision, but still remains untidy. Forty-eight hours after the 7th injection, patient became

flighty, excited, talkative and overactive. Thereafter, she lapsed into an agitated depression. Patient became tidy, lucid, and communicative after the last, 10th injection, and she was transferred to a quiet ward. She is oriented in all spheres. Insight is doubtful, she still maintains that something must have been wrong with her home. Patient is not paroled as yet, but is allowed to visit on the week-ends.

The following male patients were treated with metrazol:

W. C., age 21, who was admitted December 16, 1936, was diagnosed Paranoid Dementia Praecox. Duration of his psychosis was 3 to 4 years. Patient had been sentenced to 10 years' imprisonment for attempt to rape a 72-year-old white woman. He was almost mute and in a stupor for several months after admission. He was very untidy and destructive. Patient escaped from the hospital in April, 1937, and was returned in July, 1937. Since he returned he became excitable, noisy, contrary, assaultive, incoherent. He has shown a favorable change in his behavior since his first treatment. He had 20 injections of metrazol with 15 major convulsive seizures. He is quiet, cooperative, does not show any antagonistic tendencies, but he still is shallow and evasive in his talk.

W. A., 26 years of age, was admitted May 17, 1938; duration of psychosis 1 year and 5 months. Diagnosis: Paranoid Dementia Praecox. For months he was excitable, antagonistic, blocked and manneristic; thereafter he became unkempt, inaccessible, emotionally blunt. No improvement was noticeable up to the 6th treatment and after the 6th treatment he appeared neater and more alert to the surroundings. After the 10th treatment he started to talk about baseball and helped to mop the floors in the ward. He was transferred to a quiet ward but when the treatments were discontinued for 2 weeks patient gradually relapsed into his previous state of behavior. He was transferred back to an untidy ward. The treatments were resumed. He is very tense, resistive before each treatment. His blood pressure has been up to 180/90. It is interesting to add that patient was indifferent, and after each con-

vulsive seizure he showed motor restlessness and appeared fearful, bewildered and screamed. At present before the treatment he is tense and resentful, but after the seizure he is friendly and more cooperative. There is some hope that he may yet respond favorably to the treatments. He helps in the ward and even mentioned to the attendants that he would like to work outdoors; writes coherent letters home. Had 23 treatments and 18 convulsive seizures.

F. T., age 22 years, single, was admitted March 23, 1934. Diagnosis: Dementia Praecox, hebephrenic type. The patient was delinquent at the age of 13 and frequently ran away from home. He was placed in the Ferris Industrial School where he displayed psychosis symptoms, appeared delusional, silly and hallucinated. In the hospital he had remissions for short periods and would be allowed to work outdoors, but these periods would not last very long. Patient worked outdoors since January, 1939, during the last remission. After his second metrazol treatment he was in a state of anxiety. Two hours afterward, while working outdoors he ran away. Two weeks later he returned voluntarily and admitted that he was scared of the treatments. The treatments were resumed and he had 13 injections altogether with 5 major convulsive seizures. He is quiet, cooperative and is working in the ward at the present time.

I. McK., 27 years of age, admitted April 30, 1937, has been suffering from a psychosis of 2 years' duration. Patient served time in reformatories and penitentiaries in New York State. He wandered around in different states for years. Patient was arrested for assault and battery and while in prison appeared restless, antagonistic, hallucinated, and tried to cut his wrist with a piece of glass he had broken from a window pane. In the hospital he manifested impulsive behavior, was antagonistic, expressed ideas of influence, misidentified physician with detectives, expressed bizarre somatic delusions. Frequently he was assaultive, refused to get out of bed because he considered himself sick. He had 25 metrazol injections with 20 major convulsive seizures. In the beginning of the therapy he

became submissive, docile and helpful with ward work but at the same time he was always very suspicious. During the last treatments, he was antagonistic, apprehensive, and tense. His blood pressure is increased and he cries and begs for forgiveness. Patient is getting worse, is delusional in that he believes that the treatments are designed to make him confess his previous crimes. At times he appears to be persecuted. He tries to evade the injections by threats or by gaining the physician's favor. Some days patient appears ambitious and shows an interest in ward life.

C. T., 27 years of age, intelligent and educated, was admitted in September, 1938. Duration of illness 2 years. On admission patient was rational and coherent. He denied being hallucinated and resented any discussion about his peculiar behavior previous to admission. He expressed various somatic complaints, undoubtedly of delusional nature, maintained that he has 4 testicles, that he has bladder trouble because he was afflicted with a venereal disease years ago. Later on he became disturbed, hallucinated in the auditory and visual spheres and talked to the whole world. He showed a split of personality. He suffered from insomnia. He had 25 metrazol treatments with 19 major convulsive seizures. He is not as noisy as before but he continues to talk to himself. He shows exhibitionistic tendencies, and his delusion are paranoid in character. He is still hallucinated in the auditory sphere. Patient shows some interest in drawing and attends art class, and is helpful with ward work. Patient was free of hallucinations for the last 2 weeks but insight is lacking.

We cannot evaluate the results of treatments with metrazol because our patients are still under treatments. It is well known that the prognosis and chance of remission in chronic schizophrenics treated with metrazol depends upon the duration of disease. In our cases this factor is unfavorable and furthermore we have to face another factor which may influence the results. Among the 10 patients under treatment 7 have other psychotic members in their family and they apparently belong to an inferior constitu-

tional stock. The two sisters treated have at present a brother who is an inmate of the Delaware State Hospital, their father is described as a queer person who suffered from addiction to alcohol. Patient K. P.'s aunt is an inmate of the hospital and is suffering from Manic Depressive Psychosis, mixed type, chronic in nature. Patient E. P.'s sister is feeble minded. Patient W. A. has a brother who suffers from Dementia Praecox and an uncle who is confined to the Delaware State Hospital. Patient C. T.'s father was alcoholic and one sister is alcoholic. Patient F. T.'s brother is sentenced for life for murder. Patient I. McK.'s mother was ill for years with Dementia Praecox. Our patients all are belonging to the lower strata of society, most of them are not well educated, two excepted, one male, C. T., being a college student and one female, N. G., a teacher. How much these factors may influence the prognosis is hard to determine. It is important also to mention that our colored wards are overcrowded and while the patients are improving we do not have a chance to separate them from noisy, deteriorated patients.

From the group of patients treated, only one recovered. She still is not discharged and it is too early to come to the conclusion that it is a steady remission. The other patients' improvement means only a better adjustment to ward life as they are more cooperative, are quieter and participate in ward activities, and their delusions do not interfere with their behavior.

CLINICAL CONTRIBUTION TO THE STUDY OF THE PHARYNGEAL MYOCLONUS

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and E. KELEMEN, M. D.,*

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The publication of the following case-report is prompted by the presence of unusual phenomena. The palato-pharyngeal myoclonus is a relatively rare neurological syndrome and has become more widely known since the interesting studies of the French school on this type of myoclonus. According to Guillain, this syndrome can be attributed to a rhom-

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benecephalic lesion, especially to an involvement of the olivo-dentate complex. The etiology of the syndrome seems to be quite varied according to the nature of the organic process.

The patient of our observation is a 66-year-old white man, who has received hospital treatment for kidney trouble about ten years ago, and who since about the same time has been complaining of dizzy spells. He had an attack of influenza in February, 1937. During the past ten years, he has grown irritable and cranky, and for about one year prior to his first admission to our hospital in August, 1937, he has been rather tottering. Finally he became paranoid, expressed ideas of infidelity concerning his wife, and he became so aggressive that hospitalization was found imperative. In August, 1937, his tendon reflexes were found feeble on the upper extremities. There was a tendency to fall to the right side or backwards in Romberg position. Blood pressure 170/85. A psychiatric diagnosis of psychosis with cerebral arteriosclerosis was made.

On a recent readmission the following physical status was observed:

Patient shows a kyphosis with a moderate degree of scoliosis. The left shoulder is lower in relation to the right one. There is an aplasia of the left external ear and an atresia of the left external ear canal. The left mastoid process appears less developed. There are a large number of subcutaneous tumors of lipomatous and fibromatous character on trunk and extremities. He has a right indirect inguinal hernia.

Head: Active and passive movement apparently normal, no sensitiveness of the skull to pressure or tapping.

Eyes: Conjugate movements normal, no nystagmus. The pupils are large, equal in size, irregular in outline, and react sluggishly to light.

Nerves apparently normal.

The facial skin folds appear flattened on the left side.

Tongue: Protrudes in midline, and shows a moderate tremor. The palato-pharyngeal arches are moderately and equally elevated during phonation. There is a distinct velo-

pharyngeal myoclonus present. The contractions are rhythmical and show a rate of 180-200 per minute. The character of these movements has not changed since first observed early in March, 1939.

There is no evidence of any impairment of the skin or joint sensibility. Muscular strength is fair on all extremities. The Romberg trial reveals a tendency to fall to the right side. Patient is unable to stand on one foot alone. His gait is somewhat stiff, and carried on with spraddling feet. While walking, he shows a peculiar tendency to hold the right arm in an abducted and semi-flexed position. The right arm, however, is not held in a rigid posture, but shows upward and downward movements, whereas the left arm shows regular pendular concomitant movements. There is a certain awkwardness noticeable in the performance of diadokokinetic movements on the right side, much less distinctly on the left. There is some ataxia noticeable on the right extremities during finger-to-nose, and heel-to-knee trials. There is also some tendency to deviate to the right side when patient is walking forward or backward with closed eyes. There was no distinct tendency to past-pointing during the Barany trial.

When patient is standing in Romberg position with the arms elevated to shoulder height, the left arm shows a tendency to flex in the elbow so that the left forearm utterly appears to rise.

When patient was asked to spread the fingers, his left hand showed a tendency to remain curved, and the left fingers were less well separated than the right ones.

The tendon reflexes are active on both arms, more so on the right side. Finger reflexes are slightly positive on the right side, absent on left side. Meyer positive on both sides. Abdominal and cremasteric reflexes are absent on both sides. There has been a slight patellar clonus on the right side, ankle clonus has been present on both sides, perhaps somewhat stronger on right side. However, at present they cannot be evidenced any longer. Babinski positive on both sides. Oppenheim and Gordon reflexes absent. Mendel and Rossolimo present on both sides.

There is no particular muscular rigidity, nor any evidence of paralysis on the extremities.

According to our observation we found a strange combination of symptoms in a patient who is evidently showing signs of cerebral arteriosclerosis. It is impossible to prove that the rhomencephalic signs can also be ascribed to the same arteriosclerotic process because unfortunately we are unable to state how long the myoclonic phenomena have been in existence. The myoclonic syndrome has been related to arteriosclerosis in a variety of cases published in the literature.

To summarize our observation, we have found in an arteriosclerotic patient, presence of a palato-pharyngeal myoclonus which possibly, though not with certainty, may find its interpretation in the same vascular process as the other neurological manifestations.

ORIENTATION IN THE USE OF SULFANILAMIDE AND ITS ALLIED COMPOUNDS

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One of the most striking agents for combating infectious diseases has been found in the discovery of sulfanilamide and its allied compounds. Heidelberger and Jacobs of the Rockefeller Foundation first called attention to the bactericidal properties of para-sulpho-amido-azo-compounds in 1919, but this approach to the treatment of certain infectious diseases was not developed further until 1935, when D. Domagk (*Deut. Med. Wsch.*) demonstrated its value as a therapeutic measure in experimental studies with mice, using the hydrochloride of 4'-sulphamido—2:4, diaminoazobenzol, synthetized by Nietzch and Klarer.

The drug was first used clinically in the treatment of erysipelas (in Germany) in the form of the disodium salt of 4'-sulfamido-phenyl — 2azo-7-acetylamo-1-hydroxy-naphthalene-3-6-disulphonie acid and known as Prontosil. Favorable results were obtained in combating hemolytic streptococcal infections. Subsequently investigators in different countries, especially in England and the United States, demonstrated that amino-benzene, sul-

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phonamide, commonly known as prontylin or sulfanilamide, would protect mice against streptococcal infection. They found that sulfanilmide has the same therapeutic activity as prontosil but is less toxic when given orally.

In animals who had succumbed from the administration of sulfanilamide no histologic changes due to the drug could be demonstrated in the liver, kidneys and other viscera. Chromatolysis, however could be found in certain parts of the nervous system, especially in the neurons of the anterior column of the spinal cord, cortex and midbrain. All investigators agree that the drug must be used with care and in smaller doses when renal disease is present. Sulfanilamide is completely absorbed from the gastro-intestinal tract and only an unimportant fraction is excreted in the faeces. The kidneys are almost the sole avenue of excretion for the drug and to increase the urinary output during its administration therefore seems indicated. The blood level of sulfanilamide varies in different individuals though the dosage per kilo be constant. This makes it imperative to ascertain the blood sulfanilamide level frequently in patients under intensive therapy.

Alexis F. Hartman, Anne M. Perley and Henry L. Barnett made a study of the changes in the acid-base balance following the administration of sulfanilamide. They found that the urine promptly became alkaline with a simultaneous reduction of carbon dioxide blood content and a rise in the serum pH. The change in the acid-base balance was believed to be that of a carbon dioxide deficit type of alkalosis rather than an alkali deficit type of acidosis and a result of hyperventilation. It is believed that the tubules of the kidney fail to reabsorb the bicarbonate. They, therefore, concluded that the administration of alkali during sulfanilamide medication was not only unnecessary but might be definitely contraindicated. Fantus, however, in discussing this subject, says: "There can be no doubt that simultaneous bicarbonate administration increases the potency of sulfanilamide. A study of over 1000 cases at Cook County Hospital seems to show that the gross death rate is almost cut in half by si-

multaneous bicarbonate administration, provided that the sulfanilamide is given in liberal doses, about 4 gm. daily and early (within the first three days)."

When blood agar plates containing sulfanilamide in various dilutions are seeded with hemolytic streptococcal cultures no antihemolytic properties can be demonstrated. The antitoxic properties of the drug have been tested by an attempt to neutralize the streptococcal toxin used for the determination of susceptibility to scarlet fever, but the tests failed to reveal such action. Neither do high concentrations neutralize the fibrinolytic qualities of cultures or interfere with fibrin formation in tubes not containing streptococci. In vitro methods have failed to reveal the mode of action of this drug. Edwin E. Osgood believes that sulfanilamide neutralizes the toxins of the beta hemolytic streptococcus. The organisms do not seem to be killed directly by the drug, but it permits the bactericidal action of human serum and to some degree phagocytosis to kill organisms which they would not be able to destroy otherwise.

Barney Silver and Manning Elliott, in a recent article, formulated a useful classification of toxic side-reactions following the administration of sulfanilamide.

1. The generalized systemic reactions, including malaise and the fever-rash syndrome.
2. The hemopoietic depressions, including the agranulocytic and hemolytic anemias.
3. Toxic involvement of either the central or the peripheral nervous system.
4. The sensitization phenomena similar to those which occur with arsphenamine, cinchophen and aminopyrine.

Cyanosis of the skin and mucous membranes is rarely absent when the drug is given in adequate dosage. This cannot be attributed to the appearance of sulf or methemoglobin since these abnormal pigments cannot be demonstrated in the blood with regularity. But because they do appear in some patients receiving drug and sometimes appear after the administration of such sulfates as magnesium or sodium sulfate, the blood should always be examined for their presence. Within a few days fever and cutaneous eruptions may occur. The eruption manifests itself in various

forms, such as urticaria, exfoliative dermatitis, edema of face or other parts of the body, hemorrhagic and purpuric rashes or scarlatiniform eruptions. Acute hemolytic anemia, with a 20 to 40 per cent decrease in hemoglobin and the erythrocytes, accompanied by nucleated red cells, reticulocytes and anisocytosis with a tremendous increase in the leucocytes, constitutes a very serious complication. When granulocytopenia occurs, the outcome is almost always fatal. It is generally conceded that sulfanilamide causes a decrease in the leucocyte count. Involvement of the nervous system may be exhibited by a variety of manifestations such as delirium, paresthesias, nerve palsies or even psychosis.

Sulfanilamide has been tried as a therapeutic measure in numerous diseases with streptococcal etiology and also in conditions caused by other organisms.

Prontosil was first used in cases of erysipelas with excellent results in Germany. It curtails the duration and the spread of the lesion, the period of pyrexia as well as the toxemia. It has been found that one gram, given every four hours until the fever ceases and further spread is controlled, is effective. The dosage is then reduced to .75 gram t. i. d. until recovery is complete.

The use of sulfanilamide in scarlet fever holds forth good promise. In one hundred cases in which large doses of sulfanilamide were combined with massive intravenous serum, only eight cases showed complications. In the one hundred control cases in which this drug was not employed, complications occurred in forty-one cases. The future will show whether it is not possible that the serum may even become an adjunct to the treatment of this disease by sulfanilamide and perhaps the drug may even prove to be a good prophylactic measure.

Many cases of puerperal sepsis responded favorably to sulfanilamide therapy, but it must be remembered that all such recoveries are not necessarily due to the administration of this drug since the disease is often mild and patients would recover without this drug. In cases, however, in which the streptococcus was found to be the etiologic factor, gratifying results were obtained.

On the other hand, in pyelitis of pregnancy, sulfanilamide is particularly valuable. Simple cases may recover in three or four days though cases of toxic or renal pyelitis require large doses and a somewhat longer period of time to obtain a negative urine. 1.8 to 2.4 grams per day has proved to be an adequate dosage.

In undulant fever the drug seems to shorten the febrile period which usually lasts two to six months under the standard forms of treatment to three or four days. In Europe striking recoveries were reported in thirteen cases.

A series of cases of chancre have been reported treated with sulfanilamide. Such cases ordinarily required four weeks to two years for recovery, but in this series of cases all made a complete recovery in five to fourteen days. No scars followed the healing of the bubo.

Efficacious results have been reported in various other conditions of streptococcal etiology such as primary streptococcal peritonitis, oral infections, pylephlebitis, liver abscess and chronic streptococcal ulcer.

The results of sulfanilamide treatment of pneumococcal pneumonia are still too meager to justify a statistical report. However, results in cases so treated, are sufficiently encouraging to justify the treatment. The oral route may be used routinely unless the patient is unable to take or retain the drug by mouth. In one series of one hundred and fifteen cases an initial dose of fifteen grains or one gram per kilo was given unless the patient weighed over 160 pounds when the maximum dosage of 120 grains or 8 grams was given. During the next twenty-four hours the same total amount was given divided into six equal doses, the first of which was given four hours after the initial dose. An equal amount of sodium bicarbonate was given at the same time. The blood sulfanilamide level should lie between seven and fifteen mg. per 100 c. c.; preferably it should be about ten mg. When the administration of the drug is begun early the temperature falls to normal in 20% of the cases within twenty-four hours; in about 40% within forty-eight hours and in others in one

hundred and twenty hours. In patients responding to sulfanilamide treatment the blood cultures usually became negative within twenty-four hours after this medication was instituted. It should be remembered, however, that the blood culture may become negative and death still occur. Furthermore, extension of the pneumococcic process is not always prevented, though this is not necessarily fatal. Resolution seems to take place earlier and more rapidly. Complications, such as empyema, occur with less frequency and pleural effusions do not progress to the purulent stage. The figures indicate that the mortality rate is reduced approximately fifty per cent, but, while these figures are favorable to sulfanilamide, we must remember that they cannot be accepted as conclusive because the cases are unevenly balanced as to type, age, duration before treatment, bacteremia, degree of consolidation, etc. At present, a combination of sulfanilamide and serum is more effective in overcoming the pneumococcus in human bone marrow cultures and it may be that the combined treatment will also give better results in man.

Though authentic recoveries from pneumococcic meningitis, attributed to spinal drainage and antiseptic serum can be found in the literature, the mortality rate in this disease is notoriously high. A report from the Cincinnati General Hospital is therefore of particular interest. In the ten years preceding 1937 there were 23 cases of pneumococcic meningitis and a mortality rate of 100%. Since then they have treated six cases with sulfanilamide with recovery in three cases. The literature reports at least thirty cases of recovery from this disease in which part of the treatment consisted of sulfanilamide or related compounds.

Since the initial glowing reports of the value of sulfanilamide in the treatment of gonorrhreal infections, subsequent studies have moderated the enthusiasm, though the drug has proved to be of unprecedented benefit in the treatment of this disease. In a series of 200 cases of gonorrhea in the male, 58% obtained a cure in less than one month without any other form of treatment. A second group, comprising 21% of patients treat-

ed, showed less response but with the addition of local therapy likewise gave results much superior to those obtained with previous forms of therapy. In anterior and acute anterior posterior urethritis, additional treatment in the form of mild protein silver instillations was used. Sulfanilamide makes possible the much earlier use of posterior medication and an average period for cure of forty-five days. The remaining 21% had unsuccessful results. Some had toxic reactions, while, in others, the infection persisted in spite of the drug. Potter and Mahoney report that the effect of sulfanilamide in chronic gonorrhea and the subacute forms is much better than in the acute cases and this fact is now generally recognized. Similar results were obtained in a series of 1425 cases. But it is believed that, in the male, the use of sulfanilamide will carry a higher mortality rate than the gonorrhea itself. But with the aid of sulfanilamide 75% of patients should be cured in less than eight weeks which will decrease the number of carriers. This is an important consideration in the attempts made to control this disease.

In spite of the encouraging results obtained with sulfanilamide, efforts have been made to prepare derivatives that may be more effective, especially against pneumococcic infections. Whitby recently reported that sulfapyridine (2-p-aminobenzene-sulfonamido-pyridine) will protect mice against minimal lethal doses of 10,000 pneumococci of type 1, 7 and 8 and against slightly smaller numbers of types 2, 3 and 5. Numerous reports of clinical results obtained in the treatment of pneumonia by sulfapyridine are now appearing in the literature. Series of cases so treated show a marked decrease in the mortality rate though the use of serum remains necessary, especially in severe and complicated cases. As a routine, typing of sputum, taking of blood cultures, frequent blood counts and daily urinalyses should be carried out. The same side reactions may occur with sulfapyridine as with sulfanilamide and therefore the physician should be constantly watchful for the appearance of the first signs of undesirable and dangerous symptoms.

In conclusion, we should bear in mind that sulfanilamide as well as sulfapyridine must be considered in the same light as the arsphenamines. Both are highly valuable in controlling serious, communicable diseases, and require intelligence and judgment in their use. Sulfanilamide and its allied compounds are inexpensive and easily administered, from recent reports, sometimes too easily. But, if properly used, a solution may have been found for the treatment of a large number of diseases with a high mortality and morbidity, and which constitute a trying problem both from the individual and social standpoint.

WOMAN'S AUXILIARY

The last meeting of the current year was held on May 9th at the Wayside Inn, Smyrna.

At this meeting Mrs. Roberta Williams, executive secretary of the Travelers' Aid Society, talked on the work of her organization, and Mrs. Clarence Fraim told of her recent trip to the Holy Land and Mediterranean countries.

A business session was held and reports were given by Mrs. J. H. Mullin, Mrs. C. E. Wagner, Mrs. A. L. Heck, Mrs. D. D. Burch, Mrs. N. W. Voss and Mrs. Alexander Smith.

The president, Mrs. Ira Burns, announced the nominating committee as follows: Mrs. G. C. McElfatriek, Mrs. P. R. Smith, Mrs. C. J. Prickett, Mrs. R. C. Beebe and Mrs. I. W. Mayerberg.

Mrs. L. J. Jones gave an account of plans for the celebration of the 150th anniversary of the Medical Society of Delaware next October. The Auxiliary will assist with the anniversary preparations, when Mrs. Rollo K. Packard, of Chicago, national president, will be a guest.

Mrs. Ira Burns was elected a delegate to the national convention, and attended all meetings of the board of directors and executive meetings held between May 14th and 19th in St. Louis.

The new president-elect is Mrs. V. E. Holcombe, of Charlestown, W. Virginia.

Mrs. Burns will give the report at the October meeting of the Auxiliary.

DELAWARE ACADEMY OF MEDICINE

Since the publication of the editorial in the March Journal—Wanted: Biographies and Photographs—in connection with the observance of the Sesqui-Centennial of the Medical Society of Delaware to be held in October of this year, several items have been received and others promised:

A medicine jar which belonged to Dr. John McKinley, one of the founders of the Medical Society in 1789, and who was the first president of Delaware, the rulers of the state being called presidents in Colonial times.

A group photograph taken on June 11, 1896, at the home of Dr. Joseph H. Chandler, at Centerville. Dr. Chandler was president of the society in 1892.

A letter from Dr. Chandler, October 25, 1883, to Dr. Charles Green, transmitting a copy of the report of a microscopic examination of a brain tumor.

A list of those who have served as presidents of the Society will be published in an early issue.

HITLER'S QUACKS

Because Chancellor Hitler has chased 3,000 Jewish doctors out of Germany and revoked the licenses of the remaining 3,000, the Third Reich faces a serious shortage of physicians. To increase the number of "Aryan" doctors, Hitler last month announced that beginning April first, the period of medical education will be reduced by two full years. Last week he legally recognized *Heilpraktiker* (healing physicians) over 25 years of age. To practice medicine all a *Heilpraktiker* need show is an "intuitive ability" to cure the sick and three years of successful work in healing. Purpose of licensing practitioners who would be labeled quacks in most other countries, was said to be the eradication of quackery.—*Time*, March 6, 1939.

EDITORIAL

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established everywhere throughout the country. The state hospitals for mentally ill have improved their physical and scientific facilities to give better care and treatment to those who are mentally ill. Many research laboratories were instituted throughout the country. It is true the forty-eight states combined do spend less than one million dollars a year on research, yet the care of mentally ill in this country costs the taxpayers more than two hundred million dollars a year, not considering the expense involved in the care of patients in private sanitariums.

On January 1, 1927, there were 284,000 mental patients in state hospitals in the United States, while ten years later, January 1, 1937, there were more than 411,000 patients. This tremendous increase in the population of mental hospitals is continuing.

All states complain about their mental hospitals being overcrowded. There is a constant increase in new admissions.

The psychiatrists are aware of the fact that the best way to cope with the situation is to educate the people to consider the preventive measures for mental health as important as the physical ones, to spend more money for extra-mural work and to induce the family physician and the people to hospitalize their mentally ill when the process is in its incipient stage, so that a larger percentage will recover from the disease than has in the past and is at the present.

To accomplish this the American Psychiatric Association as well as the American Medical Association in conjunction with the National Committee for Mental Hygiene should attempt to induce the psychiatrists, physicians as well as the laymen to put mental hospitals on the same fundamental basis as the general hospitals in the community. The mental hospitals should not be accepted on the basis as institutions for delinquent, feeble-minded, etc.

It is our proposal that the mental hospitals

EARLY CHANGES NECESSARY IN THE PRESENT STATUS OF MENTAL HOSPITALS

For over thirty years the better thinking psychiatrists of this country, through organized means as well as individual efforts, have attempted to overcome many century-old ideas about insanity (mental illness).

American Psychiatric Association, American Medical Association, the National Committee for Mental Hygiene and other national, state and local organizations have attempted to educate the public in understanding the fundamentals of mental illness.

Mental hospitals, state and private, have spread the knowledge of mental illness through their extra mural work. Child guidance and adult mental hygiene clinics were

throughout the United States should have a special department for acutely ill, who are not suffering from any homicidal or suicidal tendencies and who could be voluntarily admitted either through their own efforts or through the efforts of their families, for a period of from four weeks to one year, during which time, it would be obvious whether the case had possibilities for readjustment, rehabilitation and cure, or not.

This particular department would have all modern scientific facilities from the organic as well as from a psychobiological viewpoint. Hospitals should spend as much as \$3.00 per day per capita for patients admitted to this department, and the relatives who are able to pay anything against this expenditure should not hesitate to do so.

Group hospitalization policies should include such care in their clauses. Thus we will have an ideal mental hospital section which will be known as the Psychiatric Observation department of the State Hospital.

We also propose that such a department should not be in close approximation to the other buildings occupied by chronically ill.

States where they have three or less mental hospitals should not have any central body, but the board of each hospital could play the same role as the central body. States where they have more than three mental hospitals should have a department of mental health as a central agency with a well qualified psychiatrist at the head, who will assume the responsibility of the coordination of the work in these hospitals.

Naturally the existing local, state and national laws in regard to mentally ill should be changed accordingly and this can be done through the efforts of the local and national, medical, psychiatric and bar associations.

Delaware has been very fortunate in the past ten years, with the establishment of a psychiatric observation department and the change of laws, which has enabled mildly mentally and nervously ill to admit themselves voluntarily for care and treatment.

PSYCHOMETRIC CHANGES FOLLOWING INSULIN THERAPY

JOSEPH JASTAK, Ph. D.,*

Farnhurst, Del.

Schizophrenic patients are reported to show striking beneficial changes in behavior and personality after insulin treatment. It seems that hypoglycemic shock is capable of reversing those psycho-biological processes which bring on the disease. Persons with extreme egocentric and asocial tendencies again become sociable and alert to the outside world. Their hallucinations disappear. Their delusions are cleared up by the gradual reappearance of good judgment and logical reasoning. Patients become more manageable in conduct due to favorable changes in their volitional and emotional disposition. They return to their daily duties and willingly participate in social functions. In some cases the restoration of the former normal personality is complete.

Statistics on the effect of insulin shock vary considerably partly because of the subjective evaluation of the disease symptoms and the induced changes, partly because of great differences in the severity and duration of the illness in the groups treated, and partly because of differences in the therapeutic procedures, including psychotherapy. Patients are usually grouped into four classes following the treatment. (1) Recovered patients exhibit no psychotic symptoms, have insight into their condition, regain their capacity for work, and show no personality defects. (2) Socially recovered patients are fit for work, are free from definite psychotic symptoms, but retain some observable behavior peculiarities. (3) Improved cases are able to do simple work and may even be paroled, but display definite psychotic symptoms. (4) Among the unimproved may be some who show brief transitory improvement and some who remain unchanged. Since the number of remissions and partial recoveries attendant upon insulin therapy is three to five times as great as the number of spontaneous remissions, psychiatrists are inclined to regard the favorable changes as a direct result of the treatment.

Investigators who study the mental improvements are impressed by the character-

*Chief Psychologist, Mental Hygiene Clinic, Delaware State Hospital.

ological nature of the changes. Patients seem to lose some of their character anomalies in the course of the treatment. This observation provokes important questions.

Are these character changes associated with corresponding changes in intelligence test results? If so, what is the nature of the test changes? To what an extent do the psychiatrists' subjective observations agree with the psychologists' objective findings? Do changes in test ratings reflect changes in level of intellect? If not, what do they represent? The psychometric records of 17 patients treated with insulin at the Delaware State Hospital will be consulted to shed some light upon the problems just raised. They were selected from a larger group of treatments cases for their completeness. All 17 patients were tested before and after insulin therapy. Furthermore, 8 of the 17 were re-examined about one year after the cessation of the treatment.

Before we proceed with the presentation and discussion of the results, let us explain some of our routine psychometric procedures. No examination is considered complete unless at least three psychometric quotients are derived for each patient from reliable test scales. Any one of the ratings may be utilized by the psychologist for purposes of diagnosing the patient's intellectual endowment. Usually the highest rating is used, because intellect is considered a potentiality. Potential capacities are, in all sciences, measured not by the average of what actually happens but by the value representing the functional maximum. Intellect, as all biological and social phenomena, is functionally never consummate. Its latency is exemplified by the mal-development of many of our mental functions. The majority of our daily adjustments remain at levels far below that of our intellect. In our estimation, then, the highest reliable quotient, regardless of the nature of the psychometric test, approximates intellect best. The test function represented by the highest value and the relationship of the remaining values to each other may be used for the purpose of studying some other attributes of behavior. The distribution of the quotients in each individual case is known as a psychometric pattern. The Stanford-Binet quotient

usually forms one part of the pattern. Its diagnostic worth in regard to intellect is relatively low. Its mental age, being an average of the lowest failure and the highest success, has little more than a nominal value. It is frequently quite inaccurate in the prediction of both success and failure. Diagnoses of intellect based on the highest value of a three test pattern are five to six times as accurate as those based on the Stanford quotient alone. Intellect is not to be confused with abilities and adjustments, as these obviously depend on much more than intellect.

Eight years of experience with psychometric patterns has permitted us to correlate certain behavior characteristics with these patterns. Psychotic patients have what we call the disorganization pattern. It may be added that practically all psychotics are disorganized, but not all disorganized persons are psychotic. The patterns of this study are composed of four quotients each. They are derived from the Terman Vocabulary Test, the Stanford-Binet Scale (1916 Revision), the Army Individual Performance Scale (7 non-verbal tests), and a Memory Series (reversing digits). The quotients have a 15-year divisor. Now let us illustrate a typical disorganization pattern by using the results of one of the patients of this study.

Name of Test	Test Age	Test Quotient
Vocabulary	16-9	112
Stanford-Binet	10-11	73
Army Performance	6-9	45
Memory Series	4-3	28

The patient is a 32-year-old woman, of better than average social standing. She completed two years of high school and later married a minister. She has been seriously ill since the beginning of 1935. Her mental condition was practically unchanged following insulin treatment in March, 1938. She had been tested five times with the Stanford-Binet by four different examiners between March, 1935, and April, 1939. The five Vocabulary quotients were 113, 110, 112, 112, 112; the five Binet ratings were 80, 79, 73, 73, 68. According to old-fashioned methods of intellectual diagnosis she would be called dull normal with subsequent deterioration of intellect. According to her pattern analysis, she has been and still is of bright average intelli-

gence with marked progressive disorganization of behavior (not intellect).

One of the dynamics of a psychometric pattern is that, in case of adverse changes in personality and character, the discrepancies become wider, and conversely, in case of beneficial changes, they become narrower. When improvement is very marked all the low ratings may increase up to the level of the highest quotient. Should the highest quotient be too low for the individual's potential endowment, some of the low ratings may even rise above the highest score. This rule holds true not only for hospital patients and the disorganization pattern, but is equally applicable to all other patterns and above all to children. Thus if a child's quotients range from 65 to 103, we can say not only that he is of average intelligence, but that his Stanford-Binet quotient of 65 is likely to rise up to the average level, should a favorable change occur in the child's environment or in his mental condition or in both. For it is well known that some individuals with Stanford quotients of 65 are otherwise intellectually superior, some are average, some dull, some borderline, and some distinctly feeble-minded. The pattern method assumes of course that no essential change in the person's intellect has occurred. Since there are as many patterns as there are patients, the technique lends itself to an objective clinical study of each individual as a distinct social personality. Furthermore, it enables us to take up rather confidently certain important challenges to our system of examination and its results. It saves us from making a diagnosis of general mental deficiency or inferiority where there is none. It relieves us of the necessity of apologizing for the inadequacy and invalidity of the Stanford quotients in 85 cases out of 100. It hardens us against the rash assumption that a change in I. Q. signifies a corresponding change in intellect. It does this, first, because intellect is not identified with any one test quotient; second, because intellect is accurately determined to begin with; and third, because the non-intellectual factors are clearly identified and the changes they may produce in future test ratings are predicted.

Insulin shock therapy has supplied the

psychiatrist with a valuable approach to the treatment of dementia praecox and the psychologist with an opportunity to test his tests. The insulin cases which we are about to study from the psychometric angle are, as a group, definitely above average in educational and social status. There are among them 2 college students, 6 high school graduates, 6 public school graduates (8 to 11 grades), and only 3 sixth and seventh graders. From their social histories we would expect their intellectual potentialities to be greater than average. Their test averages are presented in Table 1.

Table 1. Average Test Quotients Obtained by 17 Psychotic Patients Before and After Insulin Therapy.

	Vocabulary	Stanford	Army	Memory
Pre-Insulin	105	83	75	59
Post-Insulin	106	93	86	72

The vocabulary quotients are several points above average and, according to our method of interpretation, approximate the true level of the patients' intellect best. Their variations from test to test are relatively insignificant. The Stanford quotient of 83 cannot be considered a valid rating of intellect, because it is lowered by the non-intellectual factor of disorganization. As the latter is made less severe by treatment, the quotient rises, in our case from 83 to 93. The same is true even to a greater extent of the Army and Memory quotients. The difference between the highest and the lowest pre-insulin quotient is 46 points. The difference between the highest and the lowest post-insulin quotient has narrowed down to 34 points. Had the mental improvement of the group as a whole been greater than it was, the test differences would have become still smaller. This can best be demonstrated by dividing the 17 cases into several groups according to their degree of improvement. This grouping was done by a psychiatrist on the basis of the patients' progress notes written during and immediately after the course of insulin treatments. The previously described categories were used for purposes of classification. Table 2 contains the results of the grouping according to degree of improvement.

Table 2. Degree of Improvement of 17 Patients Treated with Insulin.

Group	Number	Percent
1. Recovered	0	0
2. Socially recovered	2	12
3. Improved	10	59
4. Unimproved	5	26

The duration of the illness of these patients, previous to insulin therapy, was as follows: 6 had been ill less than a year, 6 had been ill between one and three years, and 5 had been ill for more than three years. Only four patients were paroled following the treatments, two of the socially recovered group and two of the improved group. Table 3 lists the average pre and post-insulin quotients for the three groups of patients separately.

Table 3. Average Test Quotients Obtained by 17 Patients Before and After Insulin Therapy, Grouped According to Degree of Improvement.

	Vocabu-	Stan-	No.	lary	ford	Army	Memory
Socially recovery	Pre-Insulin	112	2	103	82	83	66
	Post-Insulin	111		103	108	106	110
Improved	Pre-Insulin	106	10	80	70	67	63
	Post-Insulin	107		91	82	70	70
Unimproved	Pre-Insulin	5	105	88	80	71	
	Post-Insulin	105		90	84	70	

The results of Table 3 indicate a close agreement between the psychiatrists' reports and the psychometric findings. Among the unimproved there were two cases who showed significant increases on one test. The number of cases is too small to render the results conclusive, although the number of reliable quotients used reduces possible inconsistencies to a great extent. It is very likely that each test pattern is more reliable than the four quotients of which it is made up.

A period of 8 to 12 weeks elapsed between the pre and post-insulin examinations. One might argue that the repetition of a test within such short time would lead to increased ratings because of the patient's familiarity with the tests rather than because of his mental improvement. If this were true, then all groups should show slight equal increases in the various ratings. The average increase in the Stanford quotient is 26 points for the socially recovered patients, 11 points for the improved group, and only 2 points for the unimproved group. Examiners with extensive experience in retests of hospital patients do not believe that familiarity with the tests alters the ratings to any appreciable extent. Furthermore, whenever relapses are reported by the psychiatrist the psychometric results drop correspondingly on those tests which are most easily affected by increased dysfunctioning. This happens even if the tests are repeated several times within relatively short intervals.

Eight of our patients were re-examined

about one year after the cessation of insulin treatments. Six of the eight are reported to have suffered relapses, while two seem to have remained about the same. Table 4 contains the average test quotients for all three examinations.

Table 4. Average Test Quotients Obtained By 8 Patients in Three Examinations.

Time	Vocabulary	Stanford	Army	Memory
Pre-Insulin	112	82	67	53
Post-Insulin	111	96	83	70
One year later	109	88	73	62

From the results of this table it is apparent that the discrepancies decrease with improvement and increase again with reported relapse. The group as a whole seems, according to test results, to be still above their pre-insulin level of general efficiency.

There are several changes in the psychometric results which are not apparent from the averages listed so far. One of them concerns the problem of the scattering of successes within the Stanford and the Army Seales. Just as the final test ratings become more disparate with the severity of the psychosis, the scatter of failures and successes within the test scales becomes wider. This is due largely to the lowering of the basal age in the Stanford test as the degree of disorganization increases. The changes are listed below.

Table 5. Basal Ages on the Stanford Test Before and After Insulin Therapy.

Basal Age	Pre-Insulin	Post-Insulin
7	3	0
8	11	7
9	0	3
10	1	3
12	0	0
14	1	3
16	0	1
18	1	0

The strong tendency of all disorganized cases to base at the 8-year level is also well brought out in these insulin cases. Of 420 hospital patients examined during the past two years, 47 per cent have an 8-year basal on the 1916 Revision of the Stanford-Binet Seale. The vocabulary quotients of the 11 cases basing at 8 range from 66 to 124, indicating that people of widely varying degrees of intelligence and education tend to drop to the 8-year basal when they become disorganized. The changes in basal age were quite striking. Wherever any improvement occurred, the basal age increased. All tests previously failed below the new basal age were repeated during the post-insulin examination and were easily passed by all improved pa-

tients. Five of the eight cases examined a third time dropped to the pre-insulin basal, two remained unchanged, and one had a rise of two years in comparison with both the pre and post-insulin test. It is noteworthy that there are practically no changes in the upper age limit even during periods of severe disorganization. In such cases, the basal age drops and the number of successes between the basal and the upper limit decreases, but the upper limit remains the same. This has important implications, since in cases of large scatter the intellectual endowment lies closer to the highest success than to the traditional mental age.

To demonstrate the value of pattern analysis in the diagnosis of intellect as well as other attributes of behavior, we will briefly present the case of a young man who was considered socially recovered. Here are the results of his three examinations:

Time	Vocabulary	Stanford	Army	Memory
Pre-Insulin	118	80	68	37
Post-Insulin	118	120	118	108
A year later	116	91	70	47

The basal age of his first Stanford examination was 8 years. The post-insulin basal was 14 years. In the third test, a year later, it dropped to 8 years again. The variability of the single subtests of the Army Performance are presented below. The figures are quotients calculated for each item from its standard score and mental age.

Name of Test	First Test	Second Test	Third Test
Ship Test	62	118	91
Manikin-Profile	114	118	69
Knox Cubes	66	126	66
Cube Construction	87	103	67
Reproduction of Designs	75	126	75
Mazes	49	103	45
Healy II	0	135	84

This patient has been ill about 11 months previous to insulin therapy. He comes from a poor foreign-born family. He was always considered intelligent, he completed an academic high school course at 16½. He could not go to college for financial reasons and was unable to find work. He was committed to the hospital in October, 1936, at the age of 21. His response to the first psychometric attempt was a convulsive giggling which lasted more than an hour. His only scorable response was a definition of the word "envelope." He called it "an encasement for epistles."

The following are brief abstracts from the

psychiatrist's progress notes at the time of the three psychometric examinations.

September, 1937. Patient is asocial preoccupied and obviously delusional. Acts impulsively and assaults others without warning or provocation. Must be tube fed, sleeps poorly. Appears confused, starts a sentence without completing it, stares at people in a bewildered manner. Sits by himself and broods when permitted to do so. Diagnosis: Dementia praecox, paranoid type.

November, 1937. Completed his course of insulin treatment. Is showing striking improvement. Free from psychotic symptoms. Eats and sleeps well. Is perfectly cooperative, responsive, and alert. Has been granted ground parole. Exhibits a mild tendency to ruminate and some lack of initiative. Both may be inherent personality peculiarities. Paroled as improved November 22, 1937.

Returned from parole September 10, 1938.

January, 1939. Is obviously deteriorating despite efforts to keep him occupied. Is untidy, dresses improperly, exposes himself. Is so impulsive and destructive that he had to be taken out of the occupational therapy class. Sits on the floor and stares straight in front of himself. Becomes irritable on the slightest provocation. Attacks attendants, nurses, and physician. Urinates on the floor at any time of the day or night, then wipes it up with his coat, shirt, or bed clothes. He is taken to the toilet at regular intervals, but will not use it. Talks to himself in undertones, is very asocial, assumes statuesque positions with additional agitation in the form of manneristic and symbolic gestures and grimaces.

We have employed the mental changes following insulin therapy as an illustration of the practical value of psychometric patterns in the study of human behavior. We have confirmed the general impression that the display of intellect in any psychometric examination is a secondary matter. The psychometric results do not represent, as is commonly believed, specific abilities within the narrow framework of intellect, but personality characteristics within the broad scope of several behavior dimensions. Two of these dimensions are more evident in this study than the others, although all dimensions

affect all tests simultaneously. If one of them were left out, life would be impossible. To give a more concrete example, an object 4 feet long, 3 feet wide, and zero feet high is no object at all.

Intellect is the popular term for one of the attributes of behavior. If intellect is a dimension, it has no further components. It is neither an ability nor an adjustment, although it enters into both. It is not conscious activity. Its absence is equally serious in new as in old situations. Intellect, as a dimension, has no time, area, or altitude, because *it is altitude*. The altitude of behavior may operationally be defined as the highest psychometric value derived from, let us say, 10 or 15 reliable test batteries, each differing from the other and each homogeneous within itself.

The other dimension which is fully evident from the test results previously presented, may be called relevance of behavior or eneraey. The operational definition of eneraey is based on the diserepancy value between a certain test supplying the high rating and certain other tests supplying the low rating. Altitude and eneraey are entirely independent traits, since the correlation between the altitude value and its position in relation to the eneraey tests is always zero or close to zero.

A practical illustration of the necessity of distinguishing between intellect and relevance is in point. A colored psychotic man once defined the word "seorch" as "the discoloration due to partial oxidation of cellulose" and the word "eyelash" as "the hirsute adornment on the edge of the eyelid." These definitions were made in response to stimulus words which the average child of eight knows. High intellect manifests itself in simple situations as well as in complex ones. The man's answers are worth twenty years of mental age, though the quantitative value of "seorch" and "eyelash" is eight years or less. The same man was told during the same examination that "An engineer said that the more ears he had on his train, the faster he could go." When asked what was foolish about this, he insisted that "the engineer was justified in trying to economize." This response is, from the viewpoint of intellect, also worth twenty years of mental age; from the

viewpoint of eneraey, it is a complete failure. But it is a very intelligent failure. This man was not only distinctly superior in intellect, but also distinctly queer in conduct and reasoning. Psychometrically, his mental condition is well expressed by a Vocabulary quotient of 142 and an Army Performance quotient of 69. His delusions and hallucinations were highly intellectualized.

The operational definition and the objective measurement of altitude and eneraey of behavior may dissolve the difficulties associated with the sort of intelligence which everybody is "measuring," though nobody knows what it is.

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THE EFFECTS OF TREATMENT FOR READING DISABILITY

A Case Study

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One of the most serious problems confronting the average school teacher today is the formation of a program to help children of adequate intelligence who have not learned to use educational tools profitably. Many of the children who cause the greatest disturbance in classroom routine are very intelligent, even superior. They are often unable to use their abilities adequately in school because of certain adverse conditions which hinder them in learning. The organization of remedial coaching in school subjects thus becomes an important factor in aiding children in school adjustment.

The following case study will be used to point out the routine and technique in diagnosis and treatment in one type of school subject deficiency, reading disability. The case was treated at the Mental Hygiene Clinic as a cooperative service for the school which referred it.

Martin was originally referred by the rural supervisor in 1931. The problem was stated to be "school difficulty." He was at that time seven years old and described by the psychologist examining him as very cooperative, friendly and talkative. The intelligence rating of 71 obtained on the Stanford Binet tests occasioned the report that:

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"The boy will reach a probable final limit of mental development of about 11 years, 6 months. The boy claims that, at times, he is 'hard of hearing' in both ears. His hearing should be examined in order to determine if his low intelligence quotient is due to sensory defect. If this is not the case, he is eligible for a special class, and should be transferred to one as soon as it is available."

At the time of the first contact it was commonly believed that the Stanford-Binet test was the sine qua non in testing. It is now recognized in many clinics that the Stanford test is a useful diagnostic tool since a skillful examiner may interpret the intra-test variability as a measure of different deficits in the thought process, but alone, it gives a reliable indication of the patient's true mental endowment only in a few cases where the behavior of the child is truly consistent. The test is so markedly affected by reading difficulties, concentration defects, memory impairment and educational opportunity or neglect that its value as a sole measure of intellect may be questioned. When Martin was tested, the intelligence quotient obtained branded him as a very dull child and all his school difficulties were thought accounted for on that basis, as no hearing impairment was found.

The case was then closed since the services requested had been carried out. Nothing further was heard concerning Martin's difficulties or adjustment until May, 1938. At that time the case was again referred to the Mental Hygiene Clinic by the Division of Special Education. The summary sent to the clinic included, beside the results of psychometric tests, statements concerning Martin's school behavior:

"Martin was referred for examination because he is getting nothing from school work and refuses to apply himself to any assigned tasks. However, according to reports he quickly apprehends social relationships. All his study characteristics are very poor and his memory is good for sense impressions only. The educational record states that he is a disciplinary problem and insists upon having his own way. He is indifferent to both failure and success.

"Martin is described as talkative, stub-

born, disobedient, unambitious and friendly. During the examination he was cheerful but indifferent to failure. Although he cooperated well, he was careless. His memory was poor.

"Martin should have been placed in an opportunity class years ago. He is not working up to capacity since he is capable of doing fourth grade work and is only doing third. Emphasis should be placed on teaching those things which will be of value in later life. Only the rudiments of instruction should be stressed. Handwork or manual training should be provided. If he can be made to develop a genuine interest in some school activity, he may become less of a behavior problem."

Martin appeared at Clinic a few weeks later. He was a well set-up boy, cheerful but doubtful about Clinic procedures. He stated casually that he wasn't going to bother about the tests if they were like "school work." He was, however, easily persuaded to try them and because of his abhorrence to pencil work the battery was begun with the manual performance tests. Martin soon became absorbed in these and spontaneously expressed enjoyment. The good rapport thus established was carried over into the verbal and school achievement tests readily and no further resistance to the situation was expressed through any act or statement.

The following test quotients and grade ratings were obtained:

Terman Vocabulary Test	CA: 14-4	MA: 11-5	IQ: 82
Stanford-Binet Test	10-2	73	
Cornell-Coxe Performance Test	14-2		102
Spelling	Grade	1.9	
Reading	Grade	2.4	
Arithmetic	Grade	3.2	

The psychologist reported that the psychometric and achievement patterns indicated a marked reading disability and mild instability. The former was thought to be dominant in causing his school retardation. The latter was believed to be a partial factor in his non-conformist behavior. In spite of these adverse forces, it was apparent from the test ratings, as well as from general observations of alertness, construction ability and comprehension of goals that Martin was average in intelligence.

During psychiatric interview, the psychiatrist found the boy to be productive in talk and self-revealing. He disliked school because he was unable to do the work. He was not embarrassed over his school failure. He had been told by his parents, as well as by one or two teachers, that he was stupid.

The boy's attitude toward school was found to be in part a reflection of parental attitudes. In addition, his attempts to learn constantly met with frustration. He consequently lost interest in achieving scholastic success and accepted the dictum that he was unable to learn. When told that he had average intelligence, and when the reason for his learning difficulties was explained to him, he responded by saying that he would be interested in studying during the summer if he could "get out of the fifth grade."

The reasons for Martin's failure to learn to read are characteristic of approximately forty per cent of the school population. His symptoms were a tendency to confuse letters such as p and b, or b and d. The only difference between these letters is one of directional orientation, and since Martin is markedly left-handed, his natural directional orientation is in the opposite direction from that of the natively right-handed person. In consequence, he tended to read in reversed fashion, seeing "saw" as "was", "bad" as "deb", and even "02" as "20". He could read mirror print with no more errors than normal print and in a much shorter time.

It was obvious then from the whole picture of Martin's difficulties that retraining in reading was an absolute necessity if any school progress was to be expected. Martin had then been in school eight years, had managed to get as far as the fifth grade, but could not read better nor spell as well as the average child in second grade.

A program of individual reading instruction for one hour a week during the summer months was instituted. Clinic load, unfortunately, prevented the allotment of more time to a single case, but even this small amount of coaching was profitable.

The first step in retraining consisted in breaking down written material into the smallest symbolic units, the single letter. Each

letter was then associated with its phonie equivalent by writing and pronoucing. The major objective of this method was to teach the letter form through motor organization associated with hearing, because the natural lateral orientation of the child in visual spheres was not dependable. As soon as the most commonly used consonants were readily recognized, small words using a single vowel sound, short a, were introduced. These were used in drill by the old phonie method of "families", i. e. eat, sat, bat, mat, etc. The words were written and pronouneed and were also read from printed drill material. In the beginning reading was limited to sounding out letter by letter, but Martin quickly learned to fuse these letter sounds into meaningful words.

Drills have been carried on in this manner since the first lesson. New families have been introduced as soon as those previously studied have been mastered. In addition to this, oral reading in a first reader was included, and Martin has progressed to the Third Reader at the present time.

It will be noticed that the remedial program was begun on a level below that which Martin had already attained according to school subjeet tests. The reason for this was to provide Martin with a certain measure of success from the very beginning and also to break down faulty reading habits at the lowest possible level.

From the first, Martin's attitude was one of enthusiasm and industry. He was alert to each new step in the process and was able to grasp several of the easy drills in a very short period of time. He was faithful in his attendance. In fact, he missed only one session in eight months and that was because of illness. Martin has at no time been indifferent to the situation and has always been appreciative of the time being spent to help him. He has gained immeasurably in self-confidence.

Prior to the reopening of school in the fall, the psychologist and the school principal held a conference. The principal expressed a fear that Martin's improved attitude would vanish as soon as he was forced back into the school

situation where he could not receive so much individual attention.

Fortunately, the principal's fears were not realized and clinic contact continued to have a favorable effect on Martin's school behavior.

In February, after six months of coaching, subject tests were again administered. The following ratings were obtained:

FEBRUARY, 1939

Paragraph Reading	Grade	3.2
Word Reading	Grade	3.9
Spelling	Grade	2.7
Arithmetic	Grade	3.9

JUNE, 1938

	Gain
Paragraph Reading	Grade 2.4 .8
Word Reading	Grade 2.3 1.6
Spelling	Grade 1.9 .8
Arithmetic	Grade 3.2 .7

It will be seen that Martin has gained in six months' time, eight months in paragraph reading and a year and a half in word reading (simple mechanics). This is a real improvement when one considers that Martin spent eight years in school in order to achieve two years of work.

Over and beyond the improvement, as measured objectively by the tests, Martin's changed attitude and desire to achieve school success are truly commendable.

There is no question that a great deal remains to be done before Martin is able to compete with others of his age or even in his present school grade. He has, however, at last tasted some success, and realizes that hard and steady work will help him to overcome his difficulties. The assurance that he was capable of learning and not "dumb" as he had been told, was in itself a tremendous force in his undertaking the work seriously and attentively.

Martin's case is fairly typical of a large number of our maladjusted school children. It is hoped that this study demonstrates that an intelligence quotient of 71 on the Stanford test does not preclude learning school subjects. It is important, however, to determine in each case whether the quotient is low because of inherent limited mental capacity or whether the quotient has been reduced by reading disability. If, like Martin, the youngster maintains normal social relationships, has adequate ability in manual tasks, and ap-

pears generally more intelligent than the quotient indicates, it is highly probable that his school difficulties are a result of his lack of ability to master subject material under ordinary methods, and that individual instruction in reading by phonic-kinaesthetic methods will prove profitable both in aiding him to master his lessons, and in adjusting him to the classroom routine.

SOCIAL TREATMENT IN EPILEPTIFORM ATTACKS

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"It is true that we can say today that, if psychology and psychiatry have no cure-alls for personality maladjustments, at least there are many cases in which a great deal can be done to help the sufferer to a better adjustment, and that as the extension of psychiatry into the social fields advances, with subsequent better understanding of man in his group relationships, we may confidently expect advances in the technique of treatment which will accomplish still more." (Richards, Winifred W.—Personality—Its Development and Hygiene.)

The importance of feeling tones has been recognized in present case work; therefore the patient's attitudes and reactions are the focal points in treatment. Environment plays a major role in its relationship to the behavior disorder. In this approach we find a basis for the relationship between the technique of psychiatry and the technique of social case work. The establishment of rapport with psychiatrist and social worker is the first essential.

The clinic set-up of psychiatrist, psychologist, and psychiatric social worker gives us a composite picture of the mental and physical equipment of the patient and his social development and background, thus enabling us to get a broad understanding of the problem. The psychiatrist and social worker work together, the division of responsibility is determined by the needs of the case. The psychiatrist sees the patient removed from the daily difficulties and irritations which block treatment. The social worker is in touch with

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these very factors in environment either through home calls or in relationship with teachers and others interested in the problems. Together they have an enriched picture of the emotional life of the patient. The following case illustrates this method of treatment.

Bob, an eleven-year-old boy, was referred to the Clinic by the family physician because he had been having "petit mal seizures," over a period of 17 months. The first occurred a short time after he went to sleep in the evening. His mother went into his room and found him "trembling all over." She called him by name but could not rouse him, stood him on his feet and he fell over. He regained consciousness in about ten minutes, wanted to know what had happened for neighbors whom mother had summoned were in his room. He talked and laughed with them. That afternoon, he had eaten a large number of green pears. The physician called advised to watch for worms which were found in the stools for some time after this. Patient was as bright and active as usual the following day. Three months later, he had another "trembling spell" in the night which lasted about five minutes. Mother roused him after this and he remembered nothing of it. These "trembling spells" have occurred on an average of every three or four months until the last month when there was an interval of only four weeks. There is no aura or foaming, no enuresis or weakness following the attacks.

Patient is the youngest of three children. Birth and development were normal, no thumbsucking, nailbiting, masturbation or enuresis. Chickenpox, measles, and whooping cough lightly between the ages of three and five. Otherwise he was always well except for chronic constipation. He entered school at six years, and for the first week refused to stay unless father remained with him. Is in the sixth grade now, but his teacher states that he is doing only fourth grade work and shows no interest in any subject. He is noisy, annoys his classmates, and has no friends in the group. Teacher has tried scolding and coaxing neither of which does any good. Mother has asked her not to discipline him because she fears he will have a "spell." The teacher thinks he is quite unhappy, particularly because the mother will not allow him to join the class on the playground and he stands by himself and watches the group. Previous to this year he has always received passing grades.

Patient enjoyed playing the trumpet in the school band until the onset of these attacks and also playing in a family orchestra at home. He liked both baseball and football, is fond of the radio and movies, also mechanical and electrical toys. His only playmate now is an eight-year-old boy, as his mother will not allow him to participate in any active games or play his trumpet. The boys call him "sissy" because he stands and watches them on the playground—they tease and hit him and mother will not allow him to take his own part though father believes he should. Patient is kindhearted, sensitive, quick tempered but quickly over it, easily discouraged, enjoys being babied and cries to get his own way though the older children laugh at him. When younger he used to cry when scolded but now becomes argumentative. He wants his own way and when playing thinks his way better than any other boy's. He is considered high strung but mother thinks he is easily managed because she can get around him by coaxing him. Since the onset of these attacks the physician has put him on a diet but he threatens to have a "spell" if made to eat food he doesn't like.

The home is a small bungalow, in a fair, middle-class residential section. Father is a pianist and has taught all the children to play some instrument and all enjoy playing together in the home. He has worked as a night watchman since patient was born, but usually spends an hour with the children in the afternoon and takes them on outings week-ends. He is a high school graduate, age 47 years, temperate, calm and stable. Mother, age 46 years, disliked school and left at 11 to go to work. She has had a chronic sinus infection for the past twenty years. Has always been very quick-tempered, nervous and easily upset. Since patient's first attack she has slept with him in order to watch over him in case he has a "spell" and claims she gets very

little sleep. The doctor has assured her this is not necessary. She has always babied each child and still feels patient cannot go to school unless she helps him wash and dress. She gets his meals and fusses over him and allows father and the other children to do for themselves. She rarely goes anywhere except to visit relatives. Is a good housekeeper but a poor cook. The siblings are making a good adjustment. John, age 16, is regularly employed, occasionally plays in an orchestra and is becoming interested in girls. Betty, age 15, is in the first year of high school. They have never presented any serious problems.

Psychological test ratings were given as follows:

Terman Vocabulary	CA: 11-7	MA: 9-4	IQ: 81
Stanford Binet		9-0	78
Cornell Coxe Performance		8-11	77

Patient is of dull normal intelligence, rarely works up to the level of his capacity in concrete adjustments. He is dependent, weak-willed, suggestible and superficial in his undertakings.

Psychiatrically, the boy is alert, responsive and free of such personality distortions as delusions and hallucinations. Neurological status reveals pupils of regular outline, equal in size. Normal light and accommodation reflex. No cranial nerve defects. No dyskinesias. Tendon reflexes are a little overactive but equal. Negative clonus and Babinski. Tentative diagnosis was made of epileptiform convulsions.

The child at birth is entirely dependent on his parents for all his needs. Normal development implies a gradual change from dependence upon them to dependence upon self. The child responds to each experience in life with behavior that is purposive and satisfying to him. This behavior may become constructive or destructive for each experience has an emotional value for him which impedes or slows up his social adjustment. There is an old saying that "The child is father to the man" which emphasizes the importance of training during early years in shaping personality. Environment is recognized as an integral factor, that is home, school, church, friends, and family.

Parents are often unwilling to relinquish

their jurisdiction which usually has become very pleasant to them—both as an agreeable source of interest and power. Often, too, it may be easier for them to help their children than to teach the children to help themselves and to derive satisfaction from this instead of their dependency. Sometimes parents are unwilling to relinquish control over their children's lives for some unwarranted fear of disaster, and thus warp the development of the children's growth to their full capacities. It seems difficult or impossible for parents to carry out satisfactorily the steps necessary for the gradual emancipation of their children except in so far as they are able to make a corresponding readjustment of their own lives on an emotional basis.

In this case the mother illustrates a parent who is unable to release control over her child because of the above reactions. Her interest is always centered in the youngest child and she derives her greatest satisfaction in his dependency and we find her rationalizing for not allowing him more freedom. She, herself, was very dependent upon her own mother and was "lost" at her death. She had only a fourth grade education and does not seem to function on a mature level. Her outbursts of temper verge on tantrums and her physician has warned her that she must control herself or she will have a nervous breakdown. The father seems to function on a much more mature level, both intellectually and socially and worker believes that mother does not derive the necessary emotional satisfaction from their relationship because the gap is too great, and for this reason has always turned to her youngest child.

Her own lack of education and intellectual ability is undoubtedly the reason for her lack of interest noted in all the children's school work and inability to understand their needs for companions and social activities outside the home as her own interests are so limited. It is very difficult to persuade her to try anything new. She can do well the household tasks she has learned but is not capable of managing the finances of the family or understanding why father cannot find another job during the depression. She resents John's interest in girls, which father tells her is a

normal one, and tries to prevent his going out with them. She tends to neglect father and the two other children because she says patient is sick and needs all her attention. Her fear that something will happen to him in a "spell" during sleep is her reason for sleeping with him.

Patient seems to have had a fairly normal development up to the time he entered school. One reason for this is perhaps found in the fact that the maternal grandmother was living and directed mother's care of him. The first evidence of his dependence is noted when he entered school and would not remain without father, showing that parents had not prepared him for this experience. Mother has always been over-solicitous of him, and at the time of his initial Clinie visit she was washing his face, combing his hair, or keeping him home from school when she did not feel able to do this. She also bathed him and has curtailed all his activities both at home and at school and given him nothing in place of them. She insists the teacher must not discipline him. He responds by various attention-getting mechanisms such as annoying the other children, talking out loud and more or less doing as he pleases. He shows no interest in his work and is getting all "D's". He stands by himself and watches his class play games. At home mother watches his play activities from the window. All this tends to thwart patient's initiative and social development. The deprivation of playing in the orchestra and band robbed him of one of his greatest satisfactions and no other activity is substituted. He is deprived of everything he enjoys doing and his dependency on his mother is fostered with her increased protection of him. His reactions are quite infantile in that he tries to get his own way, is called a "sissy" and teased by the boys, doesn't fight back but goes to his mother for satisfaction and comfort. He rebels against his diet and threatens to have a "spell" if he has to eat certain foods on the list in place of foods he likes.

The following recommendations were made by the neurologist, a ketogenic diet and limitation of fluid with the usual attention to elimination and phenobarbital sedation.

On the social side gradual participation in group activities and permission to play the trumpet was granted. The mother was assured that these activities would not harm him and gradually his play activities were increased. His daily regime was checked, his diet planned, and in a few months other foods added. His teacher was advised to treat him like the other children and expect more work from him. He was encouraged to assume responsibility for his own toilet, keeping his diet and a premium was placed on growing-up.

Work with the mother consisted first of trying to give her sufficient security so that she could release some of her control over patient, assisting her in planning a diet which meant planning meals for the whole family as she made all the others eat what he did, so that he would not feel badly when he saw food denied him: This really meant instruction in how to prepare dishes because mother could cook only a few things well. She was given an understanding as to why his play activities needed to be broadened, and his need for playmates his own age, and also some planned responsibility and recreation in the home. Suggestions were made for a different method in controlling him. In summer, camp was urged but mother could not accept this for fear of some disaster. He was urged to earn his own spending money during the vacation. Throughout the interviews activities were planned to give patient satisfaction on the ego side through things he was able to do.

As soon as patient reached home after being told he could play his trumpet, he called all his friends on the telephone to tell them of this. He joined the school band again and in a few weeks his teacher said she didn't know how to account for his improvement—he had not only improved in his work and conduct but had become more friendly and offered to help her with little tasks after school. In two weeks' time mother reported he was eating and sleeping better and he was enthusiastic over some of the new dishes she had prepared. At Christmas he received a radio and his boy friends made out a list of programs for him. He played football some in the fall and in the spring he was "out all

the time with the boys." By summer his father gave him a bicycle and he went on short trips with his friends. Mother still refused to allow him to become a Boy Scout or to go to camp. He is wholesomely rebelling against her over-protection and spending more time with his boy friends. He enjoys movies and is allowed to attend once or twice a week. Is urged to come to Clinic alone.

Dr. William T. Shanahan calls attention to the fact that there are many who question the so-called mental makeup of the potential epileptic believing that it is not necessarily found associated with epilepsy. Also that parents of some epileptic children show evidence of mental instability but that the reactions in all epilepsy differ only in degree of shade of color from the reactions general to all the human family.

At the end of a year we find patient has had no "petit-mal seizures" since his initial Clinic visit, medication has been discontinued, he is no longer on a diet, is in excellent health, has grown tall, is very active, enjoys playing ball and riding his bicycle with his friends. Mother has improved in releasing him emotionally, but still needs help in understanding his need for independence and guidance without dictating or dominating him.

This illustrates our attempt to establish new attitudes and habits in place of old undesirable ones, and an attempt to free patient emotionally so that he can derive satisfaction from constructive behavior that is satisfying and purposive—in other words he has begun to derive satisfaction from dependence upon self in place of dependence upon parents.

PSYCHOMETRIC SIMILARITIES BETWEEN HABITUAL CRIMINALS AND PSYCHOTICS

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Criminology or the scientific study of causes of crime began with the work and theories of Cesare Lombroso. Prior to this time criminal behavior was attributed to sin, disease, or the influence of evil spirits. Lombroso stressed heredity as the most important causative factor. He maintained "that the true criminal

is a separate species of the race, characterized by an innate incapacity of adaptation to the condition of social life, and marked off from normal man by a number of distinctive anatomical and physiological traits." His doctrines enjoyed only a brief vogue, for subsequent clinical observations and directed researches failed to substantiate his biological assumptions, and indicated that certain sociological factors must be taken into account if a comprehensive picture of criminal etiology is to be realized. However, Lombroso is appreciated for indicating the need for scientific method in this field.

Contemporary criminological thought is divided into two main schools—the sociological and the anthropological. "Criminal sociologists emphasize the external factors in the production of crime which are supplied by the social environment. Sociological theories vary all the way from those which represent a combination of the anthropological and sociological factors to those which regard the anthropological elements as either negligible or simply the result of social causes." Criminal anthropologists, on the other hand, "deal with the alleged individual characteristics of the criminal classes and hold that the environment, especially the social environment is less important as a factor in criminality than the personality of the criminal. While most criminal anthropologists have laid emphasis upon the assumed anatomical characteristics of the criminal (the group known as the biologists), some have disregarded those and have given the most attention to the psychic traits conducive to criminality (the psychiatrists)."

Psychiatry, as practiced in mental hygiene clinics and in state hospitals, does more than give "most attention to the psychic traits conducive to criminality." Criminology is regarded as a biosocial problem and accordingly, the criminal is carefully studied socially, psychologically, physically, and psychiatrically. Causation is not attributed solely to the criminal, or solely to the environment, but to factors that arise in either or both, because a given individual is always behaving in a given environment.

This paper is concerned with a description of some psychological findings that may aid

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psychiatry in the study of criminal behavior. Traditionally, psychologists in mental hygiene clinics had the function of administering and interpreting psychological tests. They are probably best known for their work in measuring intelligence and in promoting the concept of the IQ. Even with such restricted tools and techniques, they have aided in the understanding of criminology. Not so long ago such investigators as H. H. Goddard and C. Goring held that "the one vital mental constitutional factor in the etiology of crime is defective intelligence." C. Murchison, a psychologist, compared convicts' intelligence test ratings to those of men enlisted for World War service. By statistical sampling devices he was able to conclude that the intelligence of the male delinquent in this country matched that found in the general population, thus correcting a gross misconception.

By increasing the number of tests given an individual, or by administering a battery of diversified tests instead of a single test, and by better understanding the meaning of tests separately and in relation to others in the battery, the psychologist is now prepared to go one step further and correlate the behavior of criminals on psychological tests with the behavior of other types of clinical groups. Our interest here is to compare, psychometrically, habitual adult criminals with state hospital patients. When the present study was begun, it was hoped that this method would either substantiate accepted clinical observations, or throw some new light on the behavior pattern of this type of delinquent.

A brief description of the types of tests employed in the psychological examination will help the reader understand an account of the study. Three separate IQ's were derived from the Terman Vocabulary Test, the Stanford-Binet Intelligence Test (1916 revision) and the Army Performance Scale. The Vocabulary Test requires the examinee to define briefly words on a graded word list. Ratings derived from this test are in close agreement with "general intelligence" test ratings of unselected individuals. The Stanford-Binet is designed as a test of "general intelligence." It consists of a wide variety of graded mental tasks, which are grouped ac-

cording to the average age ability required to succeed in passing all tests at that level. It includes items that aim to determine level of verbal and social comprehension, memory, reading attainment, schooling, level of reasoning, and goal seeking ability. Binet results are lowered if the examinee's verbal abilities are below his level of intelligence, or if his memory and attentional control are inferior. The Army Performance Scale attempts to measure intelligence without requiring verbal responses. The seven subtests which compose the scale require the examinee to do such things as piece together parts of a picture, draw designs from memory, and construct block patterns from models. Although it purports to be a test of intelligence, different degrees of mental inefficiency, due to impairment of memory and concentration, lower test ratings.

During the past year 55 recidivists incarcerated at the New Castle County Workhouse were examined by the writer. All had at least three convictions based on such charges as larceny, breaking and entering, assault, obtaining money under false pretenses, robbery, and murder. Sentences ranged from six months to life imprisonment. 39 were colored and 16 were white. The youngest was 22; the oldest 53. Average age for the group was 30.4 years. Three had never attended school; one was a college graduate. The average man in the group attained a sixth grade education. One was diagnosed to be feeble-minded; intelligence classifications of the rest ranged from borderline defective to superior adult. Each man was given the three psychological tests described above.

The remarkable feature of the accumulated test results is that regardless of race, age, and education, 50 out of 55 or 91 per cent of the group made their highest score on the Terman Vocabulary Test and their lowest on the Army Performance Scale. If it were necessary to diagnose their intelligence on the basis of the Army Performance IQ's alone, 62 per cent would be designated as feeble-minded. Analysis of the Binet and Army subtests disclose that independent of race, age, and education most men are inferior on all types of memory and concentration tests, and all but

a few lack proficiency in expressing their abilities manually. Observations of their procedures in solving problems, and test score differences indicate that they have difficulty in retaining simple goals while seeking suitable means; that they do not plan their work well enough to avoid gross errors and to utilize time limits wisely; and that they are slow and inaccurate in grasping novel concrete relationships. On the other hand, they manifest average or above average ability on other types of mental tests. Regardless of race, age, and education, most are proficient in defining words, in reasoning through short problems in which all essential data are given, in furnishing logical conclusions to problem situations, and in all other types of test which allow the utilization of common knowledge derived from previous experiences.

The recidivists' psychometric pattern—high Vocabulary IQ, intermediate Binet IQ, and low Performance IQ—and the description of their abilities and inabilities on the scales' subtests bear a striking resemblance to the psychological picture of mental patients. We cannot be certain, however, that the two groups are identical until there is evidence to show that they pass and fail practically the same subtests on the Binet and Army Seales. It is possible to have similar psychometric patterns for different types of clinical subjects and yet find marked disagreement between successes and failures on the subtests, because the behavior characteristics of subjects in each group are basically different. Subtest successes and failures of 29 recidivists were compared with 29 state hospital patients who were matched according to race, age, education, psychometric pattern, and IQ's on all three psychological tests. No marked differences were disclosed and since they were closely matched on the main determinants of behavior, this correspondence is attributed to the basic similarity in the behavior organization of both types.

Another procedure was employed to learn the degree of resemblance between these two clinical types. Z. A. Piotrowski has devised what he calls "Psychotic Stanford-Binet Profile Keys"—a set of credit values assigned to Stanford-Binet subtests which were passed or

failed more frequently by psychotic adults of different mental ages than by non-psychotic adults of corresponding mental ages. Piotrowski holds that when an adult's Stanford-Binet profile of successes and failures shows a high percentage agreement with the "keys," it does so because that individual is either psychotic or possesses behavior traits which are apparently common to psychotics. When applied to our 55 recidivists there was a high agreement between the "keys" and Stanford-Binet profiles in 41 cases or in 75 per cent of the group. The "keys" were also applied to the men in the matched groups. In this instance, agreement between the "keys" and Binet profiles of the psychotics was high in 72 per cent of the cases, and among the recidivists, agreement was high in 69 per cent of the cases. This general high conformity between the "keys" and recidivists' Binets indicate that habitual delinquents probably share many mental characteristics, as revealed on the Stanford-Binet Scale, that are inherent in state hospital patients.

Test results of recidivists when externally and internally analyzed, when compared with test results of mental patients, and when applied to Piotrowski's "keys" indicate that our habitual adult delinquents are psychometrically similar to psychotics. In the clinic it is an established fact that psychotics reveal the "disorganization pattern"—high Vocabulary IQ, intermediate Binet IQ and low Performance IQ. A cursory analysis of psychotics explains this. True psychotics are deficient in memory, concentration, and attentional control. In behavior they tend to be distractible, irrelevant, and incoherent. Thought content and thought processes are bizarre and distorted due to a merging of reality and unreality. Whenever a test requires them to exercise abilities which they lack or which have been weakened by the psychoses, they naturally do poorly or fail entirely. Test items relatively free of such demands are performed at or near the level of their original abilities. Hence the Terman Vocabulary Test, which necessitates no immediate memory control, and which needs only brief attention spans to comprehend instructions, usually yields the best score for psychotics.

The Binet ordinarily gives an intermediate rating because it is composed of mixed items—some demanding short periods of behavior control and some extremely long ones. The Army Performance IQ is generally lowest, for here all subtests are scored on the basis of memory ability, behavior relevancy, and mental efficiency. Therefore, level of intelligence is usually diagnosed according to the Terman Vocabulary IQ, while level of present ability is estimated according to the Performance IQ. For example, a mental patient with a Terman Vocabulary IQ of 100 and an Army Performance IQ of 60 is said to possess average intelligence but due to a lack of mental control, he behaves or functions at the moron level. Because state hospital patients cannot apply their abilities to most practical and social situations, they are variously described as irrelevant, mentally disorganized, mentally inefficient, or as psychologically unstable. Since our habitual criminals show the same internal and external psychometric patterns as state hospital patients, we can validly characterize them by the same terms. They differ from mental patients in that their thought content remains undistorted. They are capable of establishing and reckoning with differences between reality and unreality.

It would be an over-simplification of the problem and even a misstatement of facts to conclude that men become habitual offenders because they are psychologically unstable. Our belief is that these men are recidivists because they possess certain mental inefficiencies which do not allow them to cope with severe discrepancies between environmental restrictions and psychobiological needs. A man may be just as disorganized as any examined recidivist, yet he may never indulge in anti-social behavior because of natural or unnatural protection from the major vicissitudes of environmental stress. On the other hand, a man may be inherently stable, but extremely unfortunate environmental conditions and experiences may cause him to become a habitual offender. Nine per cent of our group consists of men of this type. When mental disorganization becomes so acute that both form and content of mental life become distorted, then adjustment becomes impossible

even in a satisfactory environment. When this occurs, recidivist delinquent behavior becomes psychotic behavior.

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THE SOCIAL PROBLEM OF THE MALADJUSTED YOUTH

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Society has provided for care in institutions of those persons who have become sufficiently maladjusted to be classed delinquent or psychotic. But little or no provision for protection and reconstruction has been made for the group of young men and women who, although maladjusted, have developed or maintained sufficient control to avoid the career of the offender or the mentally ill. The persons whom this study concerns are the youths who have gone through the socializing processes during childhood and adolescence, of the home, school, and other agencies, and instead of being well-adjusted, well-integrated young persons, are thwarted, immature, and incompetent to meet the actualities of life. They nevertheless possess qualities which suggest that they are treatable and could rebuild their personalities if placed in controlled situations.

If the specific causes of their disabilities could be determined, the process of reconstruction and redevelopment would be more certain. Possibly in some of the cases there are inherent deterrents which make it impossible for the individual to reach an acceptable standard of social adaptability. They, however, might be brought to their maximum potentialities. In many cases of maladjustment, destructive environmental processes are apparent. Behind the inadequate young adult often are years of experiences which are retarding, repressing, and warping in their effect upon personality growth. The individual through his babyhood, childhood, and youth

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may have had limited opportunity to form habits of getting along with and enjoying people, of facing problems, overcoming handicaps and difficulties, and of accepting defeat courageously. Frequently the same environment has been lacking in wholesome, poised, well-adjusted persons as patterns for emulation.

A case illustrating the need for planned, well-supervised redirection is that of a twenty-year-old man referred to the Mental Hygiene Clinic by his employer who was "giving him another chance." The patient was of good physique, although slightly undersize, and had regular, clean-cut features. In his manner he gave evidence of refinement. The patient, several years ago, had graduated from high school with honors, but since graduation he had failed in every job he had attempted. Also he had married, but was separated from his wife and two babies, the relatives of his wife having "driven him out" because of non-support of his family.

The young man has an interesting history in that throughout his life there has been many destructive influences combined with little opportunity for emotional and social growth. His father was a gambler and drank frequently without becoming intoxicated, and had left home when the patient was age five years. The patient recalled only attitudes of indifference toward his father. At the separation of the parents, the maternal grandmother, who had always indulged the patient's mother, took over the rearing of the boy and his younger sister while the mother entered employment which permitted frequent but brief contacts with her family, as she lived in the institution in which she worked. The youth described his grandmother as domineering, strict, and quarrelsome. She permitted him no friendships. She neither allowed him to go away to play with children nor to bring acquaintances home. She gave him no responsibilities. When she sent the boy to a neighborhood store she watched him from the window, and if he were a few minutes late she cursed and beat him. So severe was the grandmother that the patient recalled school life as "contrasting in its freedom." However, at school he was unable to make

friends and seemed not to know what to do with himself when in a group. The boy was his mother's favorite of the two children. The maternal grandfather died when the patient was ten years of age, thus leaving no man pattern in the family contacts. The grandfather seemingly had been mild. A man teacher attempted to give the patient guidance and assistance when he was in the upper grades and high school, but the boy did not become confiding and did not accept suggestions and plans, especially those pertaining to vocational or professional training. He was not interested in a scholarship and college training. Later at the time of the clinical study, the only vocational interest expressed was that of forestry, which involves considerable advanced education. While in high school the patient participated in athletics and music. Although he played the violin well and sang bass beautifully, he refused to play or sing solos, participating only in group performances. The teacher, previously mentioned, described the patient as sensitive, withdrawn, and flighty.

The youth recalled school as "easy—never required any effort." According to his statement he read each book through at the beginning of the specific course, and later recalled the information as needed "without again opening the book." He preferred courses in which he could argue with the teacher.

During his first employment, which was in the same institution in which his mother was working, the young man became attached to a young woman employee several years older than himself. She seemingly had been his first and only girl friend. He married her several months after she had become pregnant by him. At this time he did not establish a home, but he and his wife continued to live at the institution. Shortly before the birth of the baby, they went to live with relatives of the wife, the relatives having reared the girl since her early childhood. The aunt was thrifty, meticulous, exacting, and over-religious, and the young wife followed similar standards. The patient felt the injustice of the standards, particularly as they affected the wife's uncle, whom patient admired, the

man having to meekly accept them. After a time there was a brief period during which the young couple lived in a separate home. But soon the loss of employment resulted in the return to the home of the relatives, and the patient's slovenliness and failure to contribute to the support of the family, together with the wife's again becoming pregnant, became increasingly unbearable to the aunt and wife of inflexible standards.

The patient's mother had died shortly after his marriage, and the grandmother, in her extreme grief over the death, took the young sister and went to the home of a daughter in a far distant state. Upon leaving, two weeks after the marriage, the grandmother warned the patient that his marriage would soon end in a divorce.

At a time when the man most needed encouragement, he found himself with no one upon whom he could lean. The mother who had indulged him was gone; the grandmother who had dominated him and controlled his actions was not there to direct him, the aunt by marriage was adding to his feelings of inadequacy and helplessness, and the wife was expressing disappointment in his failures. He had formed no adult pattern of conduct; he had never squarely faced a difficult situation and overcome it; so he drifted about and "bummed" between short periods of employment. He tried drinking, but gave it up, as intoxication brought depression in his realization of his inadequacies and failures. He gambled some and wondered if he had inherited the tendency from his faithless father. He thought much about stealing, but hesitated to commit crime due to the "disgrace" it would bring to his family. His teacher, who formerly had shown interest, again attempted to help the youth by offering a combination of training and work. The patient accepted the hospitalities of his teacher's home, but did not cooperate in the plans which required effort in his part. At the time of referral to the clinic the patient was being given "another chance" at the institution in which he had failed previously as an employee. For a few days the young man made a good record, but soon he was taking advantage of the superintendent. At the same time

he described his employer as his idea of an "ideal man."

The summary of the clinical study stated that physical examination revealed no gross pathology. The psychometric test ratings were given as follows:

Terrian Vocabulary Test:	CA: 20	MA: 19-8	IQ: 131
Stanford Binet	17-7	122	
Army Performance	13-10	92	

Psychiatric classification stated: "This patient is classifiable as a maladjusted individual with superior intelligence, the basis of whose difficulty seems to lie primarily in the necessity for shouldering responsibilities before he was adequately equipped to do so from a vocational-economic standpoint."

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The prognosis of the case appears poor. He is a young man with normal physical growth and superior mental development, but with the personality maturity of a small child. He is bound to be a burden to society, unless he still can be reconstructed into a better adjusted person.

Mental hygienists frequently emphasize the necessity of the child's learning, even in his early life, to face difficulties, and the importance of his being spared overprotection. On this point Sherman (1) states: "It [dissatisfaction with reality] is more intense however, in those who have not been prepared adequately to face their problems. Children generally are overprotected in their homes. As a result they may develop fixed habits of seeking protection when they meet obstacles. When they find themselves without their protection in new situations, they are likely to become emotionally disorganized." He continues: "Because of the competitive nature of our social and economic systems, the child must be brought in contact with socially important problems early in life. He should be freed from overprotection of parents at earliest age possible and allowed to solve his problems through his own resources with the least outside help. He should be taught to realize that many goals never are reached and should learn to accept frustration courageously. Only by such preliminary training will he be able to meet successfully the many responsibilities of adolescence and adulthood."

Lee and Kenworthy (2) state: "The child who can retain his security with his parents and yet at the same time can develop independence and self-security is the child who is equipped to meet the threats of reality wherever he finds them."

Aichorn (3) presents the possibility of retrieving that which has been omitted or defective in the child's life. Literature, in the subject of mental hygiene, offers much in prevention of maladjustments and considerable in treatment of children and adolescents who have behavior and per-

sonality problems. But the field of reconstructing the more promising young adult, with immature emotional and social development, is open for research.

A plan is suggested in which individuals selected for treatment would be placed under the supervision of mental hospitals. This plan would have the advantages both of frequent psychiatric interviews and of graduated employment under close supervision. In some instances it might be preferable for the employment to be in some other organization, and in any case the young man or woman would enter outside work and activities by degrees. In this way he could grow under supervision, instead of suddenly being plunged into situations in which he is bound to fail, due to his lack of emotional and social maturity. As the individual developed, trade or professional careers might be selected through vocational and educational counseling and testing. The plan would be so inclusive that social minded business and professional men and women could arrange apprenticeships and scholarships.

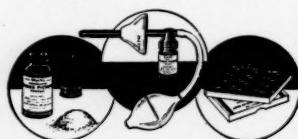
In brief, the maladjusted young person would be placed in a controlled situation for the purpose of overcoming his shortcomings and inadequacies and stimulating and promoting habit formation, ideals, and attitudes which are essential for adjustment to life situations. He would grow through receiving interpretations and learning to understand himself, as well as through experiencing by degrees process of working, taking responsibilities, facing facts, overcoming or adjusting to difficult situations, and of getting along with and enjoying people—of being an efficient member of society.

1. Sherman, Mendel, *Mental Hygiene & Education*, Longman, Green & Co.
2. Lee, Porter R. and Kentworthy, Marian E. *Mental Hygiene and Social Work*, The Commonwealth Fund, N. Y.
3. Aichorn, August, *Wayward Youth*, The Viking Press, N. Y.

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